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4.0 Environmental Consequences

4.1 Analysis and Assumptions

Assumptions

For the purpose of analysis, the following assumptions were made:

1. The Project's construction, operation, reclamation methods, and environmental protection measures contained in the CMRP (Appendix I) would be implemented on all land regardless of ownership (federal, state, and private) unless specific exceptions are stated. Individual landowners may include specific construction and reclamation requirements in ROW agreements with Keystone. These site-specific requirements are likely to result in similar or less environmental impact than discussed here.
2. Keystone would acquire all necessary federal, state, and local permits and approvals to construct and operate the Project (not including powerlines, which would be constructed and operated by power providers), regardless of whether these permits and approvals are listed.

Guidelines

1. For the Proposed Action and all alternatives, the term "Construction Phase" is defined fully in Chapter 2.0. Activities in this phase include surface-disturbing activities necessary to construct the pipeline, pump stations, lateral tie-ins, pigging stations, valves, and permanent access roads so that the pipeline system can be placed into service. It also includes reclamation activities for areas where the surface was disturbed.
2. For the Proposed Action and all alternatives, the term "Operation Phase" is the period immediately following the construction phase whereby the facilities are commissioned and placed in service to support the needs of the executed contracts. Activities in this phase include the transportation of crude oil in the Project. This definition also includes normal operations, routine pipeline ground and aerial inspections, emergency response activities, routine internal and external integrity inspections, repairs along short segments of the entire pipeline, and future reclamation activities such as reseeding and repair of erosion control structures.
3. Prior to abandonment, Keystone would coordinate with appropriate federal and state land management agencies to ensure that abandonment procedures follow agency-approved procedures at that time.
4. For all resources, unless specific exceptions are stated, short-term impacts are those that would occur over a five-year period or less, while long-term impacts are those that exceed five years.
5. Keystone's committed environmental protection measures included in the CMRP (Appendix I) were used to evaluate environmental impacts.

4.2 Proposed Action

4.2.1 Air Quality

Issues

- fugitive dust generation from pipeline construction equipment and unpaved road traffic;
- combustion emissions from construction equipment;

- fugitive emissions from pump stations and associated piping and maintenance operations; and
- emissions from the proposed Steele City tank farm.

Construction

Construction of the proposed Project would result in intermittent and short-term fugitive emissions. These emissions would include fugitive dust from soil disruption and combustion emissions from construction equipment and construction-worker commuter vehicles.

The quantity of fugitive dust emissions would depend on the moisture content and texture of the soils that would be disturbed, along with the frequency and duration of precipitation events. The majority of pipeline construction activities would pass by a specific location within a 30-day period; therefore, fugitive dust emissions during construction would be restricted to the brief construction period along each segment of the proposed Project route, with construction impacts diminishing once construction activities end and after disturbed areas are reclaimed. Fugitive particulate emissions from roadways consist of heavier particles and tend to settle out of the atmosphere within a few hundred yards. Fugitive particulate emissions would be limited to the immediate vicinity of the Project and the surrounding region would not be significantly impacted. If dust control plans are required by state agencies, they would be filed prior to land disturbance activities.

The Project would limit dust impacts in residential and commercial areas adjacent to pipeline construction by utilizing dust minimization techniques (primarily watering disturbed surfaces) in accordance with the CMRP (Appendix I). Wind-generated dust after construction would be controlled using land surface reclamation measures outlined in the CMRP.

Construction equipment would result in temporary increases in combustion emissions and local airborne particulate matter concentrations. The combustion emissions from construction equipment would be minimized because the engines are built to meet federal standards for mobile sources established by the USEPA mobile source emissions regulations (40 CFR 85). In addition, the USEPA is requiring the sulfur content of non-road diesel to be reduced from 500 parts per million by weight (ppmw) to 15 ppmw by mid-2010, reducing SO₂ and particulate emissions from diesel combustion. CO₂ is a naturally occurring gas whose presence in the atmosphere is necessary for all life. Areas near the construction of the pipeline may briefly experience slightly higher CO₂ concentrations as a result of construction vehicular traffic. Increased concentrations of CO₂, if measureable, would not cause localized adverse human health or ecological impacts.

Operation

All pipeline pumps would be electrically-driven. The pump stations do not include emergency generators, so the pump stations would not have combustion emissions. Operational emissions from each of the pump stations would consist exclusively of fugitive emissions. Since there would be a relatively small number of piping components at each of the pumping stations, only negligible amounts of fugitive emissions can occur from crude oil pipeline connections and pumping equipment at the pump stations.

The proposed tank farm to be located near Steele City, Nebraska, would emit regulated air pollutants as a result of the crude oil storage tanks. The proposed tank farm would be subject to federal and state air quality regulations, and would require an air construction and operating permit from Nebraska DEQ. Estimated emissions from the proposed Steele City tank farm based on preliminary design data, are provided in Table 4.2.1. These construction permits would be submitted within the required timeframes as specified in the regulations. Estimated emissions from the proposed Steele City tank farm, based upon preliminary design data, are provided in Table 4.2-1.

Table 4.2-1 Estimated Emissions from Steele City Tank

Emission Unit	VOC		Total HAPs		Maximum Individual HAP		Sulfur
	Lb/hr	TPY	Lb/hr	TPY	Lb/hr	TPY	TPY
Crude Oil Tank #1	1.21	5.31	0.08	0.37	0.08	0.34 (Hexane)	TBD
Crude Oil Tank #2	1.21	5.31	0.08	0.37	0.08	0.34 (Hexane)	TBD
Crude Oil Tank #3	1.21	5.31	0.08	0.37	0.08	0.34 (Hexane)	TBD
Fugitives	1.16	5.10	0.11	0.46	0.08	0.36 (Hexane)	TBD
Totals	4.79	21.03	0.35	1.57	0.32	1.38 (Hexane)	TBD

Note: Preliminary estimations are based on the following assumptions, each crude oil tank is 350,000 bbls, each crude oil tank would have an internal self supporting roof. Thirty-two turnovers would occur annually and each crude oil tank would have a mechanical shoe seal (primary) with no secondary seal.

4.2.2 Geology, Minerals, and Paleontology

Issues

- disturbance of unique geological features that are protected under state or federal programs;
- disturbance to topography resulting in disruption of drainage;
- loss of access to underlying mineral resources from installation of pipeline facilities; and
- potential damage to the pipeline and the safety of the workers due to geological hazards encountered during construction.

Construction

No unique geological features protected by federal, state, or local governments would be disturbed by the Project. There is the potential for discovery of fossils during pipeline construction. Adherence to a Paleontological Mitigation Plan prepared prior to construction would minimize adverse impacts to scientifically important paleontological resources on federal lands. Important paleontological resources on non-federal lands would be recovered only with approval of the landowners, and therefore, may be unavailable for scientific study.

It is anticipated that the pipeline trench would be backfilled with materials derived from the trench excavation. It might be necessary to obtain construction sand and gravel from local commercial sources for use as pipe padding, road base, or surface facility pads. These demands for sand and gravel would not substantially affect the long-term availability of construction materials in the area.

The effects of construction would include disturbances to the topography along the proposed ROW and at aboveground facilities due to grading and trenching activities. Upon completion of construction, Keystone would restore topographic contours and drainage patterns as closely as possible to the pre-construction condition.

Blasting potentially would adversely impact the geologic and physiographic environment. Limited blasting would be required in areas where shallow bedrock or boulders were encountered that could not be removed by conventional excavation with a track hoe trencher, ripping with a bulldozer followed by track hoe excavation, or hammering with a track hoe-mounted hydraulic hammer followed by excavation. Blasting is not anticipated because the largely sandstone-composed formations can be disaggregated by using hydraulic hammers. In the event blasting is necessary, Keystone would prepare a blasting plan for the Project.

The Project crosses several oil and gas fields. In addition, the Project may cross aggregate resources in alluvial valleys and terraces. Construction would have very minor and short-term impact on current mineral extraction activities due to the temporary and localized nature of pipeline construction activities. Many oil and gas wells were identified within or close to the Project construction ROW. Construction activities potentially could damage wells, associated underground fluid lines and pipelines, and disrupt normal operations and routine maintenance. Damage to oil and gas facilities is unlikely to occur because of required notification and surveys to locate underground facilities. Abandoned wells also could be impacted since construction potentially could remove existing abandoned well markers and damage near-surface cement plugs. Because oil and gas are typically produced from depths of more than 1,000 feet, construction of the pipeline is not expected to affect the oil and natural gas producing formations. Construction-related impacts would be limited to surface or near-surface components of the wells and gathering systems, which would temporarily disrupt production until repairs are made. Prior to construction, Keystone would identify the exact locations of active, shut-in, and abandoned wells and any associated underground pipelines in the construction ROW and take appropriate precautions to protect the integrity of such facilities. Keystone also would abide by utility locate rules in each state and conduct due diligence to identify and contact all oil and gas well operators and pipeline gathering system owners prior to construction activities.

Paleontological surveys were performed on federal lands in compliance with federal regulations. Results of these surveys are included in the Paleontological Survey Report, included in Appendix G. Pre-construction paleontological survey on private and state lands is not required by state or local regulations. There is the potential for discovery of fossils during pipeline construction regardless of pre-construction survey status, especially in areas with large historical fossilized finds in Montana and South Dakota. Adherence to the Paleontological Mitigation Plan would minimize adverse impacts to scientifically important paleontological resources on federal lands. Important paleontological resources on non-federal lands may be recovered only with approval of the landowners, and therefore, may be unavailable for scientific curation.

The main hazard of concern during construction of the pipeline would be from unintentional undercutting of slopes or construction on steep slopes resulting in instability that would lead to landslides. Other hazards may result from construction on Cretaceous shales that contain bentonite beds. The high swelling hazard may cause slope instability during periods of precipitation. When selecting the proposed pipeline route, Keystone has attempted to minimize the amount of steep slopes crossed by the pipeline. Special pipeline construction practices described in the CMRP would minimize slope stability concerns during construction and reclamation.

Operation

Operation of the proposed Project would not have a significant added impact on current or future mineral recovery operations in the area, generally because of the lack of identified mineral resources other than oil and gas. Additionally, impacts on future mineral development would not constitute a significant loss of mineral resource or mineral availability because of the narrow, linear nature of the pipeline ROW relative to the expanse of areas with mineral resource potential. No additional disturbance or loss of unique geological features, or scientifically important fossils would occur because there would be no additional surface disturbance required for operation of the Project. Also, unfavorable geologic conditions that may affect the health and safety of maintenance staff are not expected to worsen as result of operation of the Project.

4.2.3 Soils

Issues

Anticipated soil issues associated with the Project include:

- accelerated wind or water erosion on disturbed areas during construction and operation (including maintenance activities);

- reduced soil quality and corresponding reductions in the productivity of desirable vegetation or crops as a result of accelerated erosion, soil mixing, compaction, spills, or disturbance of irrigation or drainage features;
- contaminated soils encountered within the pipeline trench; and
- reclamation potential of droughty soils and unstable trench walls associated with sandy soils.

Construction

Grading and excavating for the proposed pipeline and ancillary facilities would disturb a variety of agricultural, rangeland, wetland, and forestland soils. Certain inherent soil characteristics influence the agricultural productivity and revegetation potential after disturbance. The major soil characteristics of concern and the acreage encountered of each type in each state are indicated in Table 4.2-2. The quantification of acreage for each of the characteristics is based on data in the SSURGO Soil Survey Geographic database.

Table 4.2-2 Summary of Soil Characteristics of Concern

State/ County	Total Acres ¹	Highly Erodible Water ²	Highly Erodible Wind	Prime Farmland ³	Hydric ⁴	Compaction Prone ⁵	Stony – Rocky ⁶	Shallow Bedrock ⁷	Droughty ⁸
Keystone XL Project									
Montana	4,253.2	1,457.2	103.3	967.3	19.5	3,236.1	522.9	0.0	320.3
South Dakota	4,701.2	1,500.0	227.9	1441.2	70.3	3,463.8	128.9	16.3	920.0
Nebraska	3889.2	681.5	830.7	646.6	231.1	857.7	186.6	4.3	1,071.9
Kansas	10.0	0	0	9.9	0	9.9	0.1	0.7	0
Oklahoma	2,293.6	361.3	191.1	789.5	67.6	1,574.5	412.9	197.0	275.4
Texas	5,635.7	503.9	641.6	2267.1	994.7	4,268.7	102.4	528.3	710.0
Total ⁹	20,782.9	4,503.6	1,994.6	6,119.9	1,383.2	13,407.3	1,353.8	746.6	3,297.6

¹Based on a total of 110-foot-wide ROW for a 36-inch pipe, except in certain wetlands and as agreed with landowners, in shelterbelts and other forested areas, and commercial/industrial areas where an 85-foot-wide construction ROW would be used, or in areas requiring extra width for workspace necessitated by site conditions. Acreage does not account for disturbance associated with transmission lines or access roads. Individual soils may occur in more than one characteristic class.

²Includes soils listed as identified by a SSURGO database search.

³Includes land listed by the NRCS (1995) as potential prime farmland if adequate protection from flooding and adequate drainage are provided.

⁴As designated by the NRCS (1995).

⁵Includes soils that have clay loam or finer textures in somewhat poor, poor, and very poor drainage classes.

⁶Includes soils that have either: 1) a cobbly, stony, bouldery, gravelly, or shaly modifier to the textural class, or 2) have more than five percent (weight basis) of stones larger than three inches in the surface layer.

⁷Includes soils that have bedrock within 60 inches of the soil surface.

⁸Includes coarse-textured soils (sandy loams and coarser) that are moderately well to excessively drained.

⁹Discrepancies in acreage totals are due to rounding.

Approximately 31 percent of the overall Project surface disturbance would affect soils that are highly erodible by water. Overall, approximately 29 percent of the proposed route crosses soils designated by the NRCS as prime farmland. These soils typically possess the most favorable qualities for agricultural production (e.g., fertility, structure, depth and water holding capacity, microbial populations, infiltration and percolation rates, slope, and drainage). Short-term impacts such as soil compaction from equipment traffic, excavation and

handling, and spills of fuels and lubricants may alter the capability of these soils temporarily following construction.

Approximately 13 percent of the proposed route is occupied by soils that are compaction prone. Soil compaction and rutting would likely result from the movement of heavy construction vehicles along the construction ROW and additional TWAs, and on temporary access roads. The degree of compaction would depend on the moisture content and texture of the soil at the time of construction. Compaction would be most severe where heavy equipment operates on moist to wet soils with high clay contents. Detrimental compaction also can occur on soils of various textures and moisture contents if multiple passes are made by high ground-weight equipment. If soils are moist or wet where trenchline only topsoil trenching can occur, topsoil would likely adhere to tires and/or tracked vehicles and be carried away.

Typically, soils that are compaction prone are also prone to rutting or displacement when saturated. Rutting occurs when the soil strength is not sufficient to support the applied load from vehicle traffic. Rutting affects the surface hydrology of a site as well as the rooting environment. The process of rutting physically severs roots and reduces the aeration and infiltration of the soil, thereby degrading the rooting environment. Rutting also disrupts natural surface water hydrology by damming surface water flows, creating increased soil saturation upgradient from ruts, or by diverting and concentrating water flows creating accelerated erosion. In locations where grading and stockpiling of topsoil does not occur, rutting may mix thin topsoil with the subsoil, thereby reducing soil productivity. Rutting is most likely to occur on moist or wet fine textured soils, but also may also occur on dry sandy soils due to low soil strength. Sandy soils commonly occur along the proposed route in Nebraska and include soils such as the Valentine fine sand that occur on dunes, interdunes, and valley sides of sandhills.

Stony or rocky soils associated with glacial till would be crossed in Montana. Revegetation recovery rates may be slow in these areas. Similarly, in areas of shallow bedrock (relative to the trench excavation depth), excavation may result in rock fragments remaining on the surface or within the trench backfill at levels that would limit the success of restoration efforts. Shallow lithic (hard) bedrock occurs on approximately 4 percent of the proposed pipeline route. Where the proposed pipeline route crosses soils with lithic bedrock blasting or rock saws may be required for trenching.

Approximately 16 percent of would the proposed route crosses droughty soils. The sandhills in northern Nebraska are a substantial area of droughty soils. Droughty soils would be prone to wind erosion during construction and would be more difficult to successfully stabilize and revegetate following construction. Similarly, scattered areas of saline and/or sodic soils are known to occur in the Project region. Saline and/or sodic soils often have drainage limitations and may undergo compaction impacts similar to the hydric or compaction-prone soils. In addition, the success of stabilization and restoration efforts in these areas may be limited unless additional treatments and practices are employed to offset the adverse physical and chemical characteristics of the soils.

Cretaceous shales along the route in Montana weather to form soils high in smectitic clay minerals typically referred to as bentonite clays. These soils typically have high shrink swell potentials and are also prone to erosion by water when disturbed. Soils such as the Sunburst series occur in Valley, Phillips, and McCone counties. The Sunburst series has a very high shrink-swell potential due to a high percentage of smectite clay minerals. The proposed route would cross numerous other smectitic soils such as Neldore, Scobey, Gerdrum, Creed and the Bascovy series. Badlands may also be associated with cretaceous shales and may be highly erodible and difficult to reclaim when disturbed. Please refer to Section 3.3 for further discussion on slope instability associated with cretaceous shales and swelling clays.

Keystone plans to minimize or mitigate potential impacts to soils by implementing the soil protection measures identified in the CMRP (Appendix I). The measures include procedures for conserving, segregating, and replacing topsoil, trench backfilling, relieving areas compacted by heavy equipment, removing surface rock fragments, and implementing water and wind erosion control practices. In addition, Keystone would work closely with landowners and soil conservation agencies to identify and implement recommended soil

conservation practices in specific areas where they are needed. Damaged irrigation and tile drainage systems would be repaired in accordance with the CMRP.

To accommodate potential discoveries of contaminated soils, Keystone would develop contaminated soil discovery procedures in consultation with relevant agencies. These procedures would be added to the CMRP. If hydrocarbon contaminated soils are encountered during trench excavation, the state agency responsible for emergency response and site remediation would be contacted immediately. A remediation plan of action would be developed in consultation with that agency. Depending on the level of contamination found, affected soil may be replaced in the trench, land farmed, or removed to an approved landfill for disposal.

Operation

Very small scale, isolated surface disturbance impacts, resulting in accelerated erosion, soil compaction, spills, and related reductions in the productivity of desirable vegetation or crops could result from pipeline maintenance traffic and incidental repairs. Impacts related to excavation and topsoil handling are not likely to occur. If they do occur, they would be limited to small areas where certain pipeline maintenance activities take place. During operation, these types of impacts would be addressed with the affected landowner and a mutually agreeable resolution reached.

Keystone will employ multiple safeguards to prevent a pipeline release. The chance of a spill occurring is very low and if a spill occurred, the volume is likely to be relatively small. In the unlikely event of a pipeline release, Keystone would initiate its Emergency Response Plan and emergency response teams would contain and cleanup the spill. To minimize impacts to soils, appropriate remedial measures will be implemented to meet federal and state standards designed to ensure protection of human health and environmental quality.

4.2.4 Water Resources

4.2.4.1 Surface Water

Issues

Surface water impacts from the Project include:

- water quality degradation from temporary increases in suspended solids concentrations during in-stream construction activities or erosion from disturbed lands;
- increased sedimentation in streams resulting from in-stream construction or nearby activities;
- channel and bank modifications that affect channel morphology and stability;
- reduced flows in streams where water is withdrawn for hydrostatic testing; and
- water quality degradation in streams, lakes, impoundments, or surface water-based public water supplies from pipeline spills or leaks, or from spills or leaks of fuel, lubricants, or hazardous materials during construction or operation.

Construction

Waterbody Crossings

Depending upon the construction technique used, the installation of the pipeline across waterbodies can cause the following impacts:

- temporary degradation of water quality in the form of increased suspended solids concentrations;
- increased sedimentation (deposition of solids introduced into suspension by construction activities); and

- channel and bank modifications.

As described in Section 2.1.10.2, Keystone is proposing the following water crossing techniques:

- open cut wet crossings
- open cut dry flumed crossings
- open cut dry dam and pump crossings
- horizontal directional drilling (HDD)

Geotechnical explorations were initiated to define the subsurface conditions in areas to be crossed by HDD. Preliminary site-specific crossing plans are provided in Appendix D. Keystone is proposing to utilize HDD for 33 crossings of waterbodies listed in Table 2.1-6.

Since HDD does not involve any intended direct contact with the waterbody, channel bed, or banks, no impact is expected at these crossings. It is possible that a frac-out (drilling lubricant release) or inadvertent return of drilling lubricant could inadvertently enter the waterbody. Keystone would prepare a contingency plan containing preventative and response measures to control frac-outs. At present, Keystone is proposing open-cut wet crossings at the remainder of the crossings (Appendix E). Open-cut wet crossings involve the direct excavation of the channel and banks in contact with any flow present. Additional HDD or dry crossing procedures may be considered at some of these proposed open-cut wet crossings based on a determination of crossing-specific resources (aquatic life), which may warrant mitigation. At open-cut wet crossings, the extent of increased suspended solids concentrations and downstream sedimentation impacts would depend on the flow conditions at the time of construction and the channel substrate. Measures related to managing spoil, timing, access, and equipment are included in the CMRP. These measures would limit impacts of increased suspended solids concentrations and downstream sedimentation. Most open-cut wet crossings would be completed in 48 hours or less. Larger open-cut wet crossings may take seven to ten days.

Runoff and the resulting erosion of lands adjacent to waterbodies can lead to the introduction of solids into suspension and the deposition of sediment in-stream. The CMRP includes extensive procedures to limit the extent of disturbed land adjacent to waterbodies, to control erosion, and methods to prevent sediments from entering waterbodies or wetlands. These measures include Best Management Practices (BMPs), such as clearing limits, buffer strips, drainage diversion structures, and sediment barrier installations. In accordance with the Clean Water Act (CWA), Keystone would comply with the National Pollutant Discharge Elimination System (NPDES) permit process with respect to pipeline construction and operation. Keystone would develop and file a Storm Water Pollution Prevention Plan (SWPPP) as part of the NPDES permitting effort. This plan would include BMPs to minimize soil erosion and sedimentation.

Since open cut wet crossings would involve disturbance of stream banks and channel bottoms, the CMRP includes procedures for limiting the extent of this disturbance and the restoration of disturbed areas. Restoration includes grading, stabilization, and revetment BMPs. These BMPs embrace bioengineering concepts, which encourage the restoration of natural stream banks.

The pipeline would be constructed under flood management structures (levees and drainage ditches) as well as river channels with potential for lateral scour. The pipeline would be buried at an adequate depth under channels, adjacent floodplains, and flood protection levees to avoid pipe exposure caused by channel degradation and lateral scour. Determination of the pipeline burial depth would be based on site-specific channel and hydrologic investigations where deemed necessary.

Hydrostatic Test Water Withdrawal and Discharge

Water used for hydrostatic testing of the pipeline would be obtained from surface water resources. The volume for a 50-mile test section of 36-inch pipe is approximately 14 million gallons (43 acre feet). Depending on locations, state requirements, and availability, water would be obtained and withdrawn from nearby streams

or privately owned reservoirs. If water is withdrawn from a sensitive surface water source during a low-flow period or at a time when particular flow ranges are needed for other uses, habitat reductions for water-dependent resources (e.g., fisheries, aquatic invertebrates) could occur. A similar effect on surface water resources could occur if large withdrawals are made from aquifer zones that provide late-season baseflows to streams.

In its preliminary hydrostatic test water management plan, Keystone identified 50 surface water sources which could provide hydrostatic test water, depending on the flows at the time of testing and the sensitivity of the individual waterbodies for other uses. In accordance with the CMRP, hydrostatic test water withdrawals from surface waterbodies would be made at controlled rates and with equipment that would minimize impacts on stream beds, aquatic life, and downstream water users. Keystone would coordinate with federal and state agencies to further identify such water sources and seasonal concerns. Recycling water between test sections would reduce withdrawal volumes.

Discharge permits would be obtained for hydrostatic test waters. Hydrostatic test water would be discharged to the land surface or be returned to the source water at an approved location. Discharged water may evaporate or infiltrate into the soil or drainage where the water is released. Discharges of hydrostatic testing waters would be made such that water quality requirements are met and permit requirements are followed. Discharge controls would include restrictions on pipeline dewatering rates, velocity control devices (such as splash pups or diffusers), and temporary synthetic channel linings.

Spill Prevention

Spill Prevention Control and Countermeasure (SPCC) procedures are described in the CMRP and would be implemented in the various states in compliance with 40 CFR Part 112 (for oil spills) and corresponding state regulations (including NPDES requirements for spills of other substances that may occur during construction activities).

Refueling and lubricating of most construction equipment would be restricted to upland areas at least 100 feet away from the edge of any perennial water bodies and at least 150 feet away from groundwater wells. Wheeled and tracked construction equipment would be moved to an upland area more than 100 feet away from perennial water bodies for refueling. In a few cases, such as for pumps or directional drill equipment located within or near a waterbody or wetland, refueling would be completed within or near a waterbody or wetland. In these situations, the specific measures identified in the SPCC portion of the CMRP would be followed.

Fuels and lubricants would be stored in designated areas and in appropriate service vehicles. Whenever possible, storage sites for fuels, other petroleum products, chemicals, and hazardous materials, including wastes, would be located in uplands or at least 100 feet from waterbodies and wetlands.

Operation

Normal operations would not adversely affect water resources. Minor surface disturbance activities from pipeline inspection and maintenance may occur at isolated, small, and discrete locations.

The USDOT prescribes pipeline design and operational requirements that limit the risk of accidental crude oil releases (leaks or spills) from pipelines. Over the operational life of the Project, there would be a very low likelihood of a crude oil release from the pipeline that could enter surface water resources and drinking water supplies. Keystone will prepare an Emergency Response Plan (ERP) based upon the plan currently in review by PHMSA for the Keystone Pipeline Project. The Keystone XL ERP will outline the measures that will be implemented in the event of an accident.

To reduce the amount of product that could enter surface waters, federal regulation (49 CFR 195.260(3)) stipulates that new pipelines must have valves installed on both sides of any waterbody with 100-foot or greater width between ordinary high water marks. According to the Office of Pipeline Safety (OPS),

intermittent and ephemeral streams are not considered waterbodies. In general, wetlands also are not considered by the OPS to be waterbodies. Keystone would comply with these OPS requirements. Valve locations, in addition to those required for major waterbody crossings, are described in Section 2.0. These additional valves would further aid in minimizing the amount of material released into other waterbodies in the unlikely event of a spill. The location of valves, spill containment measures, and Keystone's ERP would minimize adverse effects to perennial, intermittent, and ephemeral waterbodies, as well as to groundwater.

Keystone will employ multiple safeguards to prevent a pipeline release. The chance of a spill occurring is very low and if a spill occurred, the volume is likely to be relatively small. In the unlikely event of a pipeline release, Keystone would initiate its Emergency Response Plan and emergency response teams would contain and cleanup the spill. To minimize impacts to surface water resources, appropriate remedial measures will be implemented to meet federal and state standards designed to ensure protection of human health and environmental quality.

4.2.4.2 Groundwater

Issues

- Potential groundwater quality degradation during or after construction from disposal of materials, pipeline spills, or leaks that could seep into shallow aquifers used for domestic, agricultural, or public water supplies.

Construction

Reductions in groundwater quality from spills, leaks, or disposal practices are not anticipated during construction. Most of the aquifers along the route would be at least temporarily isolated from any spills on the land surface and attending personnel would be able to respond to an incident before contaminants migrate into groundwater. In areas with near-surface groundwater or in areas adjacent to surface waterbodies, additional procedures and measures would be implemented as presented in Section 2.0 and in the CMRP.

Operation

While routine operation of the Project would not affect groundwater resources, there is the possibility that a crude oil release could migrate through near-surface materials and enter a water-bearing zone or system. All source water protection sites within ten miles of the Project were located and are listed in Table 3.5-3.

The USDOT prescribes pipeline design and operational requirements that limit the risk of accidental crude oil releases (leaks or spills) from pipelines. Over the operational life of the Project, there would be a very low likelihood of a crude oil release from the pipeline that could enter water supply aquifers. Keystone will prepare an Emergency Response Plan (ERP) based upon the plan currently in review by PHMSA for the Keystone Pipeline Project. The Keystone XL ERP will outline the measures that will be implemented in the event of an accident.

Keystone will employ multiple safeguards to prevent a pipeline release. The chance of a spill occurring is very low and if a spill occurred, the volume is likely to be relatively small. In the unlikely event of a pipeline release, Keystone would initiate its Emergency Response Plan and emergency response teams would contain and cleanup the spill. To minimize impacts to groundwater resources, appropriate remedial measures will be implemented to meet federal and state standards designed to ensure protection of human health and environmental quality.

4.2.4.3 Wetlands

Issues

The Project may face the following issues in wetlands:

- potential modifications in wetland productivity due to the potential changes of modifications to surface and subsurface flow patterns from pipeline construction;
- temporary and permanent modifications in wetland vegetation community composition and structure from clearing and operational maintenance;
- temporary wetland soil disturbance;
- a temporary increase in turbidity and fluctuations in wetland hydrology; and
- construction through prairie pothole areas possibly resulting in permanent alterations to their water holding capacity.

Construction

Based on 2008 field survey results and aerial photo interpretation, approximately two percent of construction disturbance associated with the Project would occur in wetlands. Of this total, approximately 24 percent is palustrine emergent wetlands (marshlands and meadows), 19 percent is palustrine forested wetlands (riparian woodlands), 13 percent is palustrine scrub shrub wetlands, and 0.04 percent is stream channels and open water. None of the proposed pump stations would be located in wetlands, principally based on the site survey, aerial interpretation using US Fish and Wildlife (USFWS) National Wetland Inventory (NWI) mapping and soils data, and 2008 field surveys.

Effects on wetland vegetation would be greatest during and immediately following construction. To mitigate the potential for these impacts, Keystone would implement the procedures outlined in the CMRP.

The construction ROW width would be reduced to 85 feet through certain wetlands to minimize potential effects. Keystone would restore or mitigate impacts to wetlands affected by construction activities, to the extent practicable. Pipeline construction through wetlands must comply, at a minimum, with USACE Section 404 permit conditions. Section 404(b)(1) guidelines restrict the discharge of dredged or fill material into wetland areas where a less environmentally damaging practicable alternative exists.

For rivers that are crossed by the HDD method, streamside wetlands or floodplain forests would not be affected. Smaller streams and ephemeral or intermittent drainages would likely be open cut and wetlands located in these areas would be crossed by trenching. No permanent loss of wetlands would occur as a result of this Project; however, approximately 92 acres of forested wetland would be permanently converted to herbaceous wetland. Herbaceous vegetation in palustrine emergent wetlands is expected to reestablish to pre-construction levels within three to five years following the completion of reclamation, resulting in a short-term loss of vegetation and available habitat for some wildlife species. Trees in forested wetlands would recover in 20 to 50 years. Keystone would work with each USACE district to examine what kind of compensation would be required for this permanent conversion of wetland.

As described in the CMRP, specific construction techniques would be used to retain the hydrological and vegetation characteristics of wetlands that would be disturbed by construction. These techniques would include segregation and replacement of wetland soils (except in areas of standing water, saturated wetlands, or where no topsoil is evident) so that soil profiles and native vegetation seed and rootstock would be reestablished to help ensure successful restoration and reestablishment of local drainage patterns to restore existing surface and subsurface water flow patterns.

Operation

Woody vegetation in forested wetlands would be removed periodically above the pipeline (approximately 15 feet on each side of the centerline) to maintain visibility of the area above the pipeline for aerial pipeline observation and to permit access to all areas along the pipeline in the event of an emergency except where the HDD construction methodology was used to cross a forested repairing area.

4.2.4.4 Vegetation

Issues

The Project may face the following vegetation issues:

- temporary removal of vegetation from the ROW and ancillary facility areas during construction (with a consequent reduction in wildlife habitat and forage productivity and an increased risk of soil erosion and weed invasion);
- minimal alteration of existing vegetative communities as a result of ROW maintenance (e.g., removal of trees from wooded areas);
- potential loss of sensitive plant individuals and habitat as a result of construction clearing and grading; and
- potential expansion of invasive and noxious weed populations along the pipeline ROW as a result of construction.

Construction

Vegetation Communities

During construction of the Project, vegetation would be cleared from the construction ROW and reestablished following construction. Agricultural lands account for 24 percent of the disturbance associated with Project construction; these lands typically are disturbed every year during planting operations. There would be minimal change to agricultural lands since these areas would be allowed to revegetate in a cover similar to that found before construction. Other affected vegetation communities include rangeland (consisting of native prairie and seeded pastureland), forested woodlands, and wetlands (see Table 3.6-2). Potential impacts to wetlands are discussed under Section 4.2.4.3 Wetlands.

Pipeline construction would involve both the temporary and permanent alteration of vegetation through ROW preparation and excavation, high traffic activity, and the clearing of shrubs and trees. Vegetation recovery rates are estimated to be 1 to 5 years for herbaceous components, 5 to 15 years for low shrubs, and 20 or more years for woodlands (depending on age and species). The reestablishment of pastures, rotated croplands, and open grassland range following construction is expected to take approximately one to five years.

Reclamation, native species revegetation, and revegetation success monitoring, as outlined in the CMRP would be completed for disturbed areas within the construction ROW after Project construction activities are complete. Under normal to above-normal precipitation conditions, vegetative cover in the reclaimed areas would consist primarily of herbaceous plants after one to three years. Three to five years after reclamation, vegetative cover in reclaimed areas would consist primarily of desirable species (i.e., species in the reclamation seed mixture), with a minor component of weedy species. Reclamation success is dependent upon several variables, including soil preparation, season of seed application, and precipitation levels after seed application.

Long-term impacts to vegetation include the loss of woody species (i.e., evergreen and deciduous trees and shrub species) during clearing activities. The 50-foot permanent ROW would be maintained free of trees for the life of the Project. Within that permanent ROW, a 30-foot corridor centered on the pipeline would be maintained solely in an herbaceous condition except where the HDD construction methodology was used to cross a forested riparian area. Trees and shrubs would be removed during clearing activities and converted to early successional herbaceous and grassland communities. Trees and shrubs eventually would reinvade the temporary easement area after construction. However, shrubs would not become reestablished naturally in the temporary easement area for 5 years or more and trees would require a minimum of 20 years or more, depending on species and age of woodlands cleared.

Keystone would monitor revegetation success along the pipeline ROW according to permits and approvals. Revegetation would be considered successful if, upon visual survey, the density and cover of non-nuisance vegetation are similar in density and cover to adjacent, undisturbed lands. Reseeding would be based upon reclamation success and natural rainfall amounts received in the years following revegetation efforts. In agricultural areas, revegetation would be considered successful if crop yields are similar to adjacent undisturbed portions of the same field.

Keystone would use seed mixtures approved by the NRCS in each affected county. On federal lands, Keystone would use seed mixtures approved by the appropriate agencies. Consequently, the various vegetation types altered by the proposed pipeline, other than forested communities, are expected to return rapidly to near pre-construction conditions. Impacts that may occur if desirable plant species are not established in the ROW within a short period of time include higher soil erosion rates, increases in weedy species, and reduced forage production.

Sensitive Plant Species

Based on preliminary response from state and federal agencies, a total of 21 plant species (special status species and species of special concern) were identified as potentially occurring within the Project area. Of these, 7 are federally listed threatened or endangered plant species. The federally listed species generally are associated with native prairie or wetland/riparian habitats.

Clearance surveys will be conducted during the flowering period of sensitive plant species to ensure their absence prior to construction. If a population were located within the construction ROW, suitable mitigation measures would be developed in consultation with the USFWS.

A number of occurrences of state-listed threatened or endangered species or species of special concern were identified by state NHPs as occurring near or within the proposed Project. State listed species have varying distributions and, while rare in one state, a species can have relatively secure populations in other states. Surveys for state listed species will occur on federal and state land where suitable habitat exists.

Noxious and Invasive Plant Species

Construction surface disturbance could contribute to the introduction of noxious and invasive weed species and other undesirable plant species. These species are fast growing and could displace native species and inhibit the establishment of native grass, forb, and shrub species. Increases in noxious and invasive weed species are particularly serious within wetland areas and other sensitive plant communities. Typical locations for noxious weed infestations are riparian zones, livestock concentration areas, roads, and disturbed soils.

The CMRP provides weed control measures that Keystone would implement throughout the Project areas to minimize and control the spread and establishment of noxious and invasive species.

Operation

Pipeline operation and maintenance would have minimal impact on revegetated areas. Maintenance impacts would be limited to infrequent traffic along the pipeline ROW. Routine vegetation clearing of the ROW generally would not occur more frequently than every one to three years. Sites for ancillary facilities (e.g., pump stations) would remain cleared for the life of the Project. Operation and maintenance of the Project may contribute to the prevalence of noxious weeds; however, efforts would be made to prevent their spread.

The USDOT prescribes pipeline design and operational requirements that limit the risk of accidental crude oil releases (leaks or spills) from pipelines. Over the operational life of the Project, there would be a very low likelihood of a crude oil release from the pipeline which could injure terrestrial vegetation. Keystone will prepare an Emergency Response Plan (ERP) based upon the plan currently in review by PHMSA for the Keystone Pipeline Project. The Keystone XL ERP will outline the measures that will be implemented in the event of an accident.

Keystone will employ multiple safeguards to prevent a pipeline release. The chance of a spill occurring is very low and if a spill occurred, the volume is likely to be relatively small. In the unlikely event of a pipeline release, Keystone would initiate its Emergency Response Plan and emergency response teams would contain and cleanup the spill. To minimize impacts to vegetation, appropriate remedial measures will be implemented to meet federal and state standards designed to ensure protection of human health and environmental quality.

4.2.5 Wildlife, Aquatic Resources, and Sensitive Species

4.2.5.1 Terrestrial Wildlife

Issues

Impacts on terrestrial wildlife from the Project include:

- potential habitat loss or alteration and incremental habitat fragmentation;
- potential loss of breeding success from exposure to construction and operational noise and from higher levels of human activity;
- limited direct mortalities from Project construction and operation; and
- the potential loss of individuals from exposures to accidental crude oil releases.

Construction

Wildlife Habitat

Approximately 57 percent of construction disturbance would disturb wildlife habitat. Of this, approximately 64 percent would be grasslands/rangeland, 33 percent would be agricultural land <1 percent would be woodlands and 2 percent would be within wetlands and open water. Due to the linear nature of the project over a large geographic area (approximately 1,376 linear miles of new pipe) these acreages would represent 92 percent of available wildlife habitat along the Project ROW.

Potential impacts to terrestrial wildlife species from the Project can be classified as short-term, long-term, and permanent. Short-term impacts consist of activities associated with Project construction and changes in wildlife habitats lasting less than five years. This would include impacts to species dependent on herbaceous habitats. Long-term impacts would consist of changes to wildlife habitats lasting five years or more and would include species dependent on habitats with woody species components. Permanent impacts would result from construction of aboveground facilities that convert natural habitat to an industrial site. The severity of both short- and long-term impacts would depend on factors such as the sensitivity of the species impacted, seasonal use patterns, type and timing of construction activities, and physical parameters (e.g., topography, cover, forage, and climate).

Less mobile or burrowing species may be lost during construction by vehicles and equipment. Other potential impacts include habitat loss or alteration, habitat fragmentation, and animal displacement. Individuals may be permanently displaced and perish due to increased competition or other effects of being forced into sub-optimal habitat. Indirect impacts from increased noise and additional human presence also could lead to displacement and lowered fitness. Although the habitat adjacent to the construction zone may support some displaced animals, any species that is at or near its carrying capacity could exhibit localized increased mortality.

Habitat fragmentation is frequently a concern when clearing ROWs. In general, fragmentation results in an altered wildlife community as species more adaptable to edge habitats establish themselves, while species requiring undisturbed habitats are subject to more negative effects. These effects would result in overall changes in habitat quality, habitat loss, increased animal displacement, reductions in local wildlife and migratory bird numbers, and changes in species composition. The severity of these effects on migratory birds depends on factors such as sensitivity of the species, seasonal use, type and timing of construction

activities, and physical parameters (e.g., topography, cover, forage, and climate). The effects of fragmentation on native wildlife populations would be relatively small since the majority of the Project would cross relatively open habitat types (e.g., shrubland, grassland, and cultivated land).

The effects of long-term habitat loss on native wildlife populations would be relatively small since the majority of habitat disturbance would be restored to the pre-disturbance condition. Agricultural lands would continue to be used for pre-construction uses while native habitats would be reclaimed to primarily herbaceous communities using appropriate seed mixes prescribed by local, state, and federal agencies. Loss of shrub communities would be long-term (5 to 20 years or more) within reclaimed areas of the construction ROW since these communities would become reestablished through the natural reinvasion of woody species. Loss of woodland vegetation would be permanent since trees would not be allowed to reestablish within 15 feet of either side of the pipeline centerline. Habitat losses also would be long term at permanent aboveground pipeline facility locations such as pump stations and access roads.

Long-term conversion of wooded habitats to herbaceous communities would result in an incremental increase in habitat fragmentation in these state wildlife management areas but habitat conversion could increase habitat diversity, depending on the extent of habitats affected and the extent and distribution of undisturbed habitats remaining in the state wildlife areas. Construction during the fall hunting seasons would create conflicts with hunter use of these areas.

Steele City Segment

For big game, greater sage-grouse, sharp-tailed grouse, migratory birds, and raptors, agency-recommended seasonal buffers and timing restrictions are provided in Table 4.2-3. Development of construction restrictions will occur through consultation with the regulatory agencies. Location information, timing restrictions, and buffer distances for these species were obtained from the BLM, MFWP, SDGFD, and ENSR's 2008 aerial surveys.

Table 4.2-3 Seasonal Timing Restrictions and Buffers for Big Game, Game Birds, and Raptors¹

Species / Habitat Type	State / MP Locations	Buffer (miles)	Seasonal Timing Restrictions
White-tailed Deer Winter Range	MT	NA ²	December 1 – March 31 (MFWP); December 1 – May 15 (BLM)
Mule Deer Winter Range	MT	NA ²	December 1 – March 31 (MFWP); December 1 – May 15 (BLM)
Antelope Winter Range	MT	NA ²	December 1 – March 31 (MFWP); December 1 – May 15 (BLM)
Sage Grouse (Lek and Nesting Habitat)	MT/SD	Within 4 miles of an active lek (MFWP); Within 2 miles of an active lek (BLM)	March 1 – June 15
Sharp-tailed Grouse (Lek and Nesting Habitat)	MT/SD	Within 2 miles of an active lek (MFWP/BLM)	March 1 – June 15
Greater Prairie Chicken (Lek and Nesting Habitat)	SD	Within 4 miles of an active lek	March 1 – June 15
Raptors	Entire ROW	0.5 miles (MFWP) 0.25 NSO ² ; 0.5 TLS ³ (BLM)	March 1 – August 1 (MFWP) March 1 – July 31 (BLM)

¹ Sources: 1994 Montana Bald Eagle Management Plan; Big Dry RMP; BLM 1994, 2008a, and MFWP 2008; MFWP – Correspondence from W. Davis 8/14/08; BLM – Correspondence from J. Carlson 8/14/08 and correspondence from K. Undlin 8/22/08.

Table 4.2-3 Seasonal Timing Restrictions and Buffers for Big Game, Game Birds, and Raptors¹

Species / Habitat Type	State / MP Locations	Buffer (miles)	Seasonal Timing Restrictions
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² No surface occupancy or disturbance. For pipelines, this includes no permanent aboveground facilities year-round and no surface disturbing activities within the timing restrictions on lands administered by the MFWP and BLM.

³TLS = Timing Limitations. For pipelines, this includes no disturbance within 0.5 miles of an active nest between March 1 and July 31 on lands administered by the BLM.

Gulf Coast Segment and Houston Lateral

More than 23 percent of the land crossed by the Project is grassland/rangeland or cropland, meaning that disturbance is present on land used for hay production. Disturbance to the habitat in the proposed ROW would occur during construction. Wildlife in the area would move out to the surrounding areas to forage and seek shelter. There is suitable habitat adjacent to the proposed ROW that would remain undisturbed except for areas such as farmed land where disturbances are abundant during seasonal planting and harvesting of crops. Approximately 39 percent accounts for the land area crossed that is forested. For construction, 110 feet would be used of which 60 feet would be allowed to revert to previous vegetative cover that allows adequate space for wildlife species to establish new territories in the surrounding areas while having adequate sources of food and shelter. For highly reproductive organisms like rodents and small mammals, population effects are expected to be minimal.

Big Game Species

Steele City Segment

As presented in Table 4.2-4, construction impacts to primary big game species (white-tailed deer, mule deer, and antelope) would include the potential temporary loss of forage area and would result in an increase in temporary habitat fragmentation within the proposed surface disturbance areas. These losses of vegetation would represent only a small percentage of the overall available habitat within the broader Project region. The loss of shrubland vegetation would be long term (greater than 5 years and, in some cases, more than 20 years). In the interim, herbaceous species may become established within three to five years, depending on weather conditions and grazing management practices. In most instances, suitable habitat adjacent to the disturbed areas would be available for wildlife species until grasses and woody vegetation are reestablished within the disturbance areas. Locations for big game winter ranges were determined using data received from Montana Fish Wildlife and Parks (MFWP) and the BLM.

Table 4.2-4 Winter Big Game Ranges Potentially Affected by the Project

State / Habitat Type	MP Locations		Total Length Crossed (miles)	Acreage Affected During Construction ¹
	Beginning MP	Ending MP		
Montana				
White-tailed Deer Winter Range	54.4	57.4	3.0	40.5
	65.8	68.2	2.4	32.0
	79.8	84.9	5.1	68.4
	87.3	91.0	3.7	49.6
	121.3	124.4	3.1	40.7
	137.7	142.9	5.1	68.4
	152.9	171.0	18.0	240.5
	193.6	196.9	3.4	44.9

Table 4.2-4 Winter Big Game Ranges Potentially Affected by the Project

State / Habitat Type	MP Locations		Total Length Crossed (miles)	Acreage Affected During Construction ¹
	Beginning MP	Ending MP		
	244.5	247.2	2.7	36.3
	248.5	248.6	0.1	1.2
	279.1	282.3	3.2	42.1
Mule Deer Winter Range	28.4	29.7	1.3	17.3
	32.8	33.8	1.0	13.6
	34.3	35.2	0.9	11.9
	35.8	36.6	0.8	10.4
	37.3	65.8	28.5	380.3
	66.9	67.0	0.1	1.0
	88.5	89.3	0.8	11.0
	89.7	130.1	40.4	539.4
	131.4	131.7	0.2	3.6
	152.9	161.8	8.9	118.8
	202.9	204.1	1.2	16.4
	211.9	225.1	13.1	175.7
	244.5	247.2	2.7	36.2
	248.4	248.5	0.0	1.2
	256.7	259.9	3.2	42.8
	260.9	264.7	3.8	50.9
	269.0	280.1	11.1	148.8
	280.6	281.5	0.9	12.0
Antelope Winter Range	11.3	12.3	0.9	13.2
	12.6	13.8	1.1	15.2
	14.0	20.2	6.1	82.5
	21.5	26.8	5.3	70.6
	38.7	65.7	27.0	360.2
	74.6	82.6	8.0	107.2
	83.7	83.7	0.0	0.1
	111.6	129.0	17.3	231.2
	162.1	163.1	0.9	12.6
	163.9	164.3	0.4	5.6
	219.1	219.4	0.3	4.0
	254.9	255.6	0.7	9.6
	258.2	258.8	0.6	8.5
	267.9	280.1	12.2	162.8

¹. Based on a nominal ROW of 110 feet

Indirect impacts would result from increased noise levels and human presence during surface disturbance activities. Big game animals (especially antelope and mule deer) would decrease their use within 0.5 mile of

surface disturbance activities due to increased noise levels (Ward et al. 1980; Ward 1976). This displacement would be short term and animals would return to the disturbance area following construction activities.

Gulf Coast Segment and Houston Lateral

Project construction would affect only a single big game species, white-tail deer. Ranges of other potential big game species are peripheral to the Project area; therefore, impacts to these wide-ranging species would be negligible or non-existent. Impacts to white-tail deer would include the temporary loss of potential forage (native vegetation and croplands). The temporary loss of vegetation would represent a small percentage (less than one percent) of the overall available habitat in the Project region. No sensitive habitats for white-tail deer were identified along the proposed route. In a forested area that is predominately pine forest mixed with hardwood trees, clearing of the corridor for construction would remove all non-mast and mast producing trees and also create an edge habitat. After construction, the 50 feet permanent ROW would primarily have a herbaceous layer of vegetation which white-tail deer can forage on. A 30-foot corridor centered on the pipeline would be maintained solely in an herbaceous condition except where the HDD construction methodology was used to cross a forested riparian area. This edge habitat would be where deer might bed and create temporary shelter since white-tail deer rarely bed in the same location every night as a defense against predators.

Small Game Species

Potential impacts to small game from the Project would result in the temporary loss of and fragmentation of habitat until vegetation is re-established. Indirect impacts could include the temporary displacement of small game from the disturbance areas as a result of increased noise and human presence. Although habitats adjacent to the Project may support some displaced animals, species that are at or near carrying capacity could suffer some increased mortalities due to displacement. Displacement or loss of small game animals from disturbance areas would be short-term because of their generally high reproductive rates and the fact that animals would return to the disturbance areas following completion of construction and reclamation activities.

Steele City Segment

Potential direct impacts to small game species would include nest or burrow abandonment and loss of eggs or young where construction occurs during the breeding season. Of greatest concern is the potential for loss of lekking mating grounds and other greater sage-grouse, sharp-tailed grouse, and greater prairie chicken habitat (e.g., nesting habitat). The MFWP have implemented the following seasonal timing restrictions and buffers for surface use or disturbance (listed in Table 4.2-5):

- there should be no surface use or disturbance within a 4 mile radius of an active greater sage-grouse lek; and
- there should be no surface use or disturbance within a 2 mile radius of an active sharp-tailed grouse lek.

The SDGFD defers to these timing restrictions and buffer distances as well.

Although the Project would not result in a permanent loss of habitat along the pipeline ROW, the regeneration of sagebrush would likely be slow. A 30-year interval represents the approximate recovery period for a stand of Wyoming big sagebrush. A 20-year interval represents the approximate recovery time for a stand of mountain sagebrush (Connelly et al. 2000). The potential impacts on sage-grouse habitat would be minimized by locating the proposed ROW within previously disturbed areas (i.e., adjacent to existing pipelines and/or roads) to the extent possible. Given the abundant suitable habitat in the general area, it is not likely that the minor loss of habitat along the pipeline ROW would affect sage-grouse populations in the vicinity of the Project.

To avoid impacts of construction on nearby leks, the Project would work with regulatory agencies on activities allowed in lek buffer zones to minimize impacts (see Table 4.2-5). This would avoid impacts during any breeding periods to the known Sage Grouse leks.

Based on the BLM, MFWP, and SDGFD historic data, sage grouse lek sites that have been identified as occurring within 4 miles of the Project in Montana and South Dakota are listed in Table 4.2-5. State agencies are currently processing data to provide active sharp-tail grouse lek sites occurring within 2 miles of the Project in Montana and South Dakota (MNHP2008).

Table 4.2-5 Sage-Grouse Lek Sites

State / Habitat Type	MP Locations		Buffer Zone Length Crossed (miles)	Buffer Zone Acreage Affected During Construction ¹
	Beginning MP	Ending MP		
Montana				
	25.7	25.8	0.1	1.9
	25.8	26.4	0.6	8.5
	26.4	27.5	1.0	13.7
	27.5	28.7	1.3	16.8
	28.7	32.4	3.7	49.1
	32.4	32.5	0.1	0.9
	32.5	35.3	2.9	38.1
	42.2	43.3	1.1	14.3
	43.3	46.2	2.9	38.8
	46.2	46.5	0.3	4.1
	46.5	48.5	2.0	26.0
	48.5	50.0	1.5	19.9
	56.3	61.8	5.5	73.9
	67.2	72.1	4.9	65.2
	87.8	88.2	0.4	5.5
	88.2	88.3	0.1	1.2
	88.3	88.8	0.5	6.7
	88.8	88.9	0.1	1.6
	88.9	89.0	0.1	0.9
	89.0	89.8	0.8	10.8
	89.8	92.0	2.1	28.5
	92.0	93.8	1.9	24.8
	96.8	98.2	1.3	17.9
	98.2	101.3	3.2	42.5
	101.3	101.4	0.1	1.3
	101.4	104.4	3.0	39.3
	104.4	104.4	0.0	0.1
	104.4	104.5	0.1	1.7
	104.5	104.7	0.1	1.7
	104.7	110.0	5.4	71.6
	110.0	112.3	2.2	29.9
	112.3	112.8	0.5	6.5

Table 4.2-5 Sage-Grouse Lek Sites

State / Habitat Type	MP Locations		Buffer Zone Length Crossed (miles)	Buffer Zone Acreage Affected During Construction ¹
	Beginning MP	Ending MP		
	112.8	115.8	3.1	40.8
	207.8	211.8	4.0	52.9
	211.8	214.5	2.7	35.6
	214.5	217.9	3.5	46.3
	217.9	219.9	2.0	26.7
	229.3	229.7	0.5	6.3
	229.7	229.8	0.0	0.3
	229.8	232.1	2.4	31.3
	232.1	232.4	0.3	3.9
	232.4	233.0	0.6	28.5
	233.0	233.3	0.3	24.8
	233.3	233.8	0.5	17.9
	233.8	233.9	0.1	42.5
	233.9	234.1	0.2	1.3
	234.1	234.1	0.0	39.3
	234.1	234.4	0.4	0.1
	234.4	234.7	0.3	1.7
	234.7	234.8	0.1	1.7
	234.8	235.7	0.9	71.6
	235.7	239.4	3.7	29.9
	239.4	239.7	0.3	6.5
	239.7	239.7	0.0	40.8
	239.7	242.1	2.4	52.9
	242.1	242.2	0.1	35.6
	247.3	252.0	4.6	46.3
	255.3	260.6	5.3	26.7
	260.6	261.7	1.2	6.3
	261.7	264.4	2.7	0.3
	280.4	281.2	0.8	31.3
	281.2	281.2	0.1	3.9
	281.2	282.3	1.1	14.3
	282.3	286.5	4.2	56.0
1. Based on a nominal ROW of 110 feet Source: MNHP 2008 – Data Request				

Gulf Coast Segment and Houston Lateral

For other small mammals potential habitat for foraging would be created around ROW edges in the Gulf Coast Segment and the Houston Lateral. Edges would promote a greater diversity which creates an ecologically rich environment. Many species favor edge habitats, from omnivorous to herbivorous and carnivores, and utilize edges as not only a source to forage and feed in but as well as nesting habitat. For example, the Northern Bobwhite Quail favors mixed native grasses for nesting and foraging. The 50 foot ROW that would be

transformed by the herbaceous layer in forested areas promotes varieties of insects in which quail brood rearing is very important and the adjacent forest provides shelter from raptor species. In Polk County, Texas, this currently is predominately a monoculture of pine forest stands (planted for silviculture) that provides little food for wildlife. An edge would be created along the permanent ROW where mixed grass seeds would be planted and provide forage and shelter for many species. This would create more diversity in a confined area which wildlife could use as a surplus resource. Although habitats adjacent to the proposed route may support some displaced animals, species that are near carrying capacity could suffer some increased mortalities due to displacement. Displacement would be short-term due to repopulation of adjacent lands and high reproductive rates. Overall, losses of small game species and their habitats would be relatively short term.

Non-game Species

Direct impacts to non-game species from surface disturbance activities would result from the temporary loss of habitat and increased fragmentation until vegetation is reestablished. Potential impacts also would result in mortalities of less mobile or burrowing non-game species (e.g., small mammals, birds, reptiles, amphibians, invertebrates) due to exposure to vehicle and construction equipment traffic. Potential direct impacts also would include nest or burrow abandonment or loss of eggs or young when construction occurs during the breeding season. Other impacts would include the short-term displacement of some of the more mobile species (e.g., medium-sized mammals, adult birds) as a result of surface disturbance. Although the habitats adjacent to the proposed disturbance area may support some displaced animals, species that are at or near carrying capacity could suffer some increased mortalities. Displacement or loss of non-game species from disturbance areas would be short-term due to repopulation of adjacent lands and high reproduction rates of the species involved.

If surface disturbance activities occur during the breeding season for passerines, raptors, and other summer avian residents (approximately March 1 through August 31), nest or territory abandonment or the loss of eggs or young (loss of productivity) for the breeding season could result. Impacts to nesting birds would depend on the nest location relative to the proposed disturbance area, the phase of the breeding period, and the level and duration of the disturbance.

Steele City Segment

Of the 49 active nest sites or breeding territories that were documented during 2008 raptor surveys, 38 (78 percent) were occupied by red-tailed hawks and great-horned owls. These species are known to be relatively tolerant of human activity and development (Call 1978; Johnsgard 1988, 1990; Kingery 1998). As a result, direct impacts to nesting raptors would be limited primarily to the incremental loss of potential nest structures within the construction ROW. Since the Project will have no nest trees cut during the nesting season and very few trees will be cut along the Steele City Segment, this potential impact is minor. Impacts resulting from increased noise and human presence are expected to be minor and short term.

Gulf Coast Segment and Houston Lateral

The aerial surveys for raptors included a visual observation distance of 1.0 miles on either side of the Project centerline. In areas of habitat determined to be suitable for the occurrence of raptors and rookeries/roosts for species such as herons and egrets, an intense secondary effort was accomplished to confirm nest locations. Suitable habitat included edge-of-field habitats, open terrain bordering wooded areas, mixed woodlands near open water, large wetland complexes, rivers and impoundments proximal to the ROW. Initial surveys conducted March 24 – 26, 2008 allowed for the most comprehensive window of opportunity for visual field observations. Species presence as well as active and empty nest sites was documented to insure their consideration as potential for occurrence in the surveyed areas and support focus areas for future surveys. Additional surveys are planned in 2009 during a similar period. Pre-construction survey documentation would occur.

Operation

Pipeline operations and maintenance would have minimal effects on terrestrial wildlife resources. Direct impacts to wildlife species populations and habitats from maintenance activities such as physical pipe inspections or ROW repair would be the same as those discussed above for construction but at a smaller scale and dispersed along the entire system. In order to reduce potential impacts to important wildlife resources as a result of maintenance activities, Keystone would consult with the appropriate state wildlife agencies prior to the initiation of maintenance activities beyond standard inspection measures or outside the permanent ROW.

Keystone will employ multiple safeguards to prevent a pipeline release. The chance of a spill occurring is very low and if a spill occurred, the volume is likely to be relatively small. In the unlikely event of a pipeline release, Keystone would initiate its Emergency Response Plan and emergency response teams would contain and cleanup the spill. To minimize impacts to wildlife, appropriate remedial measures will be implemented to meet federal and state standards designed to ensure protection of human health and environmental quality.

4.2.5.2 Aquatic Resources

Issues

The impacts to aquatic resources from the Project include:

- short-term physical disturbance to stream channels;
- short-term increases in suspended solids concentrations from in-stream activities and erosion from adjacent disturbed lands;
- one-time increases in downstream sedimentation from in-stream activities and erosion from adjacent disturbed lands;
- potential fuel spills from equipment and toxicity to aquatic biota if fuel reached a waterbody;
- local short-term reductions in habitat if surface water is used for hydrostatic testing and loss of individuals during pumping; and
- potential loss of individuals as a result of acute and chronic toxicity from exposure to accidental crude oil releases.

Construction

Crossings

Since Keystone plans to use the horizontal directional drill (HDD) technique to cross 33 waterbodies (see Table 2.1-6), construction-related impacts on aquatic biota and their habitat would be minor at these waterbodies. HDD at these waterbodies would minimize impacts to important game and commercial fish species and special status species. Directional drilling would not alter or remove streambank or aquatic habitat because construction within the channel would not be required. It is possible that mud from directional drilling inadvertently could enter the active stream along the drilling route. However, if mud seepage (frac-out) is detected Keystone would implement their HDD contingency plan. Corrective measures would be implemented to eliminate or minimize seepage. If any seepage enters the stream, increased turbidity or physical impact to the covering substrate would be localized and short-term (less than one day). All preventive and response measures to frac-outs would be enumerated in a frac-out contingency plan. Open-cut trenching would be used on the remaining perennial streams, all of which contain at least one or more game fish species. Open-cut crossing can have the following impacts:

- loss of in-stream habitat through direct disturbance;
- loss of bank cover;

- disruption of fish movement;
- direct disturbance to spawning;
- water quality effects; and
- sedimentation effects

In-stream Habitat

In the vicinity of the trenchline, trenching and backfilling can result in alteration of in-stream habitat and the mortality of benthic invertebrates inhabiting that reach of the watercourse.

Studies to monitor the effects on benthic invertebrates have indicated that the impacts are short term. The disturbed area typically is recolonized by benthic invertebrates to near pre-construction levels by the spring or summer following construction (Tsui and McCart 1981; Schubert and Vinikour 1987).

Backfilling the in-stream trench can either improve or lessen the quality of habitat available. This habitat quality change would depend largely on the nature of the soil materials from the lower depths of the trench with respect to those near the surface. If backfilling results in a different material on the stream bed surface than the adjacent areas, a local habitat modification may have occurred. However, due to the limited extent of the disturbed area and the active bottom substrate sorting by a river any such habitat modification would be small and of short duration in most stream environments.

Bank Cover

Vegetative cover along the stream banks of a waterbody provides cover for fish, shading, bank stability, erosion control, and an increased food and nutrient supply due to the deposition of insects and vegetative matter into the watercourse. Loss of bank cover may result in increased water temperatures, reduced food supply, impaired aesthetics, and reduced productivity. The potential for channel migration also can be increased since the removal of vegetation destabilizes the banks at discrete locations. Given the relatively small width of disturbance associated with a pipeline crossing, the above impacts tend to be negligible relative to an entire stream system. The CMRP provides stream bank restoration measures that would ensure short-term bank stability (temporary erosion control structures) and rapid vegetation recovery (replanting woody species where appropriate).

Interruption of Fish Movement

Most water crossing methods allow movement of fish across the ROW; however, some techniques such as dam and pump (a dry crossing procedure), may block or delay normal movements. Long-term interruption of fish movement in a watercourse or a relatively short-term delay in spawning migration can have adverse impacts. Interruptions during sensitive periods typically are not a concern since in-stream construction generally can be performed outside of sensitive periods. Blockage of non-spawning-related fish movement for limited periods (less than seven days) should not affect fish growth and behavior. Delays of less than three days would not adversely affect spawning migrations (Dryden and Stein 1975). Since most streams less than 50 feet in width can be crossed in less than 2 days, this potential impact should not be a concern.

Direct Disturbance of Spawning

In-stream construction activities can displace spawning fish from preferred habitat and result in the utilization of lower quality spawning habitat. Generally, this is of limited concern for water crossing construction since in-stream activities generally are not scheduled during spawning period. Keystone would work with agencies as necessary to further define spawning periods and to refine construction schedules to avoid, where possible, in-stream activities during sensitive periods. As shown in Table 3.7-4, spawning periods for most fish species extend from April through June.

Water Quality Effects

It is widely recognized that in-stream excavation activities result in short-term increases in total suspended solids (TSS) levels and turbidity. These levels decrease with distance from the source as particles settle. The levels also decrease with time following cessation of in-stream activities. Prolonged increase in TSS can adversely affect aquatic systems in the following ways:

- triggering the drift of benthic organisms;
- reducing the abundance of insect larvae;
- damaging benthos through abrasion;
- clogging fish gills;
- damaging gill membranes;
- altering fish behaviors;
- reducing the ability of fish to feed by sight; and
- making the fish susceptible to disease by the added stress of a turbid environment.

The impact to aquatic organisms by increases in suspended solids levels is a function of the duration of exposure and the concentration of suspended solids. While relatively high levels of TSS can occur immediately downstream of a crossing, the effects are short-term with construction across most streams being complete in one day. Additionally, the waterbodies in the Project area experience wide ranges in seasonal flow rates, (large peak flows due to precipitation events) and drain through areas with relatively fine-grained soils. These factors cause sudden, natural peaks in suspended solids concentrations. The aquatic systems supported by these waterbodies are adapted to such increases for periods of time and over a greater spatial extent than that caused by a one time crossing event.

The extent of the increase in TSS would be mitigated by Keystone through the use of BMPs described in the CMRP. These BMPs include: measures to reduce the period of in-stream activity, spoil handling techniques, equipment access installation procedures, and dry crossing techniques where required. The BMPs also address upland erosion and sediment control procedures to limit the potential for runoff from disturbed areas to contribute to increased in-stream TSS.

Sedimentation Effects

Solids introduced into suspension in a waterbody ultimately would settle on the streambed downstream of the crossing. The distance from the crossing is dependent upon the depth of flow, flow velocity, particle diameter and flow characteristics. Coarser materials (sands and gravels) tend to settle relatively close to the crossing location and tend to be distributed uniformly across the stream section. Fine silts and clays can stay in suspension for considerable periods of time and would tend to settle in natural depositional areas downstream of the crossing.

Sedimentation can have the following impacts

- cover or alters fish habitat
- cover fish eggs
- cover benthic organisms

The channel substrates of the streams crossed by the Project consist primarily of fine-grained materials (clay, silt, and sand). Fine-grained excavated material deposited downstream is expected to be similar to the existing substrate. Stream flows would suspend and redeposit excavated materials during higher flow periods.

Young and Mackie (1991) found that benthic invertebrates inhabiting the upper surface of the substrate may be more adaptable to sedimentation than are taxa occupying the interstitial spaces of the substrate. Post-construction studies show benthic invertebrate populations generally recovered to normal within one to two months of construction. Tsui and McCart (1981) reported benthic invertebrate populations downstream of a water crossing recovered to near pre-construction levels shortly after construction.

Suspended sediment can prevent the successful incubation and hatching of fish eggs and the emergence of fry. This is an issue only when construction occurs during a spawning period.

The BMPs adopted for the Project as described in the CMRP would mitigate the short-term effects of downstream sedimentation, as discussed under Water Quality Effects.

Hydrostatic Testing

The CMRP preliminarily lists 50 streams or rivers as potential water sources for hydrostatic testing for the Project. The water sources are located throughout the length of the proposed route. The water is likely to be withdrawn from water sources during summer and fall months. Compared with stream base flow, relatively small one-time withdrawals would occur from the streams or rivers designated for hydrostatic test water in accordance with withdrawal permits.

The volume for a 50-mile test section of 36-inch pipeline is approximately 14 million gallons (43 acre feet). Withdrawal rates and volumes would be designed to avoid impacts to aquatic life and downstream water users. Water withdrawal could entrain small fish and drifting macroinvertebrates. The expected numbers of organisms removed during entrainment is considered to be relatively small in relation to the overall numbers in the stream or river. In summary, hydrostatic testing would result in minor impacts to aquatic biota.

Hydrostatic test water would be discharged to the land surface at an approved location or be returned to the source with an approved energy dissipation device. Discharged water may evaporate or infiltrate into the soil or drainage where the water is released. The discharge of hydrostatic test water would follow state permit requirements, which would reduce potential effects on water quality or aquatic organisms. Energy dissipaters also would be used to prevent erosion at discharge locations.

Operation

The USDOT prescribes pipeline design and operational requirements that limit the risk of accidental crude oil releases (leaks or spills) from pipelines. Over the operational life of the Project, there would be a very low likelihood of a crude oil release from the pipeline that could injure aquatic biota and habitats. Keystone will prepare an Emergency Response Plan (ERP) based upon the plan currently in review by PHMSA for the Keystone Pipeline Project. The Keystone XL ERP will outline the measures that will be implemented in the event of an accident.

Keystone will employ multiple safeguards to prevent a pipeline release. The chance of a spill occurring is very low and if a spill occurred, the volume is likely to be relatively small. In the unlikely event of a pipeline release, Keystone would initiate its Emergency Response Plan and emergency response teams would contain and cleanup the spill. To minimize impacts to aquatic resources, appropriate remedial measures will be implemented to meet federal and state standards designed to ensure protection of human health and environmental quality.

4.2.5.3 Sensitive Wildlife and Aquatic Species

Issues

The issues would be the same identified for general wildlife species in Section 4.2.5.1 and aquatic resources in Section 4.2.5.2.

Construction

Terrestrial Species

As discussed in Section 3.7.3, Sensitive Terrestrial and Aquatic Wildlife Species, a total of 129 special status terrestrial wildlife species could potentially occur within the Project area (see Appendix F). Six of these species are federally listed as threatened and endangered (black-footed ferret, whooping crane, interior least tern, piping plover, American burying beetle, and the pallid sturgeon). Surveys conducted this year have eliminated species not found in the Project area (suitable habitat does not exist) or identified specific locations where follow-up surveys are required (see Appendix F).

Table 4.2-6 Proposed Survey Schedule for Sensitive Species along the Project

Species	Locations	Time of Survey	Comments
2008			
Raptors (including bald eagle)	Aerial Survey Entire ROW	March 24-26, 2008	19 raptor nests were identified.
Rookeries (species such as herons and egrets)	Aerial Survey Entire ROW	March 24-26, 2008	4 rookeries were identified.
2009			
Rookeries (species such as herons and egrets)	Aerial Survey Entire ROW	Feb- March 2009	
Raptors (including bald eagle)	Aerial Survey Entire ROW	Feb- March 2009	
2010			
Raptors (including bald eagle)	Aerial Survey Entire ROW	Feb- March 2010	Only if construction occurs during the nesting/roosting period.
Rookeries (species such as herons and egrets)	Aerial Survey Entire ROW	Feb- March 2010	Only if construction occurs during the nesting/roosting period.
American burying beetle*	Lamar County, Texas	June-August 2010	
Texas prairie dawn-flower*	Harris County, Texas	Spring/Summer 2010	Surveys would occur within identified pimple mound wetlands.
2011			
Raptors (including bald eagle)	Aerial Survey Entire ROW	Feb- March 2011	Only if construction occurs during the nesting/roosting period.
Rookeries (species such as herons and egrets)	Aerial Survey Entire ROW	Feb- March 2011	Only if construction occurs during the nesting/roosting period.
American burying beetle*	Lamar County, Texas	June-August 2011	
Texas prairie dawn-flower*	Harris County, Texas	Spring/Summer 2011	Surveys would occur within identified pimple mound wetlands.

Steele City Segment

Potential impacts to sensitive wildlife resources would parallel those discussed in Section 4.2.5.3, Terrestrial Wildlife. Direct impacts to sensitive species from surface disturbance activities include the short-term loss or alteration of potential breeding and foraging habitats and temporary habitat fragmentation until native vegetation is reestablished. Potential impacts also could include the loss of less mobile species as the result

of exposure to vehicle and construction equipment traffic and the potential abandonment of a nest site or territory, including the loss of eggs or young (e.g., piping plover, interior least tern). Other impacts would include short-term displacement of some of the more mobile species from the disturbance areas as a result of increased noise and human presence.

A number of occurrences of state-listed threatened or endangered species or species of special concern were identified by the state NHPs as occurring near or within the Project. For terrestrial wildlife, most sensitive species may be rare within a given state but their populations are relatively secure elsewhere. In addition, most are relatively mobile species that could avoid short-term construction disturbance with no resulting long-term adverse effects on local populations. Increased mortality rates could occur in species that are less mobile as the result of exposure to vehicles and construction traffic. This would result in the loss of some individuals but the relatively narrow and linear disturbance area associated with pipeline construction is unlikely to have measurable adverse effects on local populations of sensitive species. For a few species, however, such as the greater sage-grouse, construction through an important habitat feature, such as a lek, may result in the loss of a local breeding population. This could result in extirpation of a remnant population and contribute to a trend leading to federal listing without the implementation of appropriate mitigation. Greater sage-grouse is listed as BLM sensitive species and a species of concern in Montana.

Surface disturbance activities along the pipeline ROW would result in the temporary disturbance of portions of native prairie, wetland, and long-term disturbance of woodland habitats which may contain potentially suitable habitat for a number of sensitive species. Habitat surveys were completed in 2008 to locate areas where suitable habitat may exist for follow-up species presence/absence surveys. The results of this effort are provided in Appendix F tables.

In coordination with federal and state agencies, Keystone is developing threatened and endangered species specific mitigation to reduce impacts to these sensitive terrestrial and aquatic resources. Based on those consultations, Keystone would work with the relevant regulatory authorities to determine any avoidance, minimization, or mitigation measures required. Outlined below is a summary of some of this analysis based upon what was found in 2008 surveys. Detailed further in this section are current recommended mitigation measures for specific sensitive terrestrial and aquatic species potentially occurring along the Steel City Segment of the Project.

Mammals

Meadow Jumping Mouse, Preble's Shrew, Merriam's Shrew. Potential impacts to the meadow jumping mouse, Preble's Shrew, and Merriam's Shrew from construction of the Project would be minimal due to the small amount of potentially suitable habitat that could occur along the proposed route. The highest possibility for direct impact would occur during clearing if heavy equipment collapses dens and tunnels while navigating the ROW, or during the trenching process. Once operational, the pipeline corridor would provide loose soil for dens and rodent burrows, plus forbs, grasses and seeds for rodent forage. During reclamation, the proposed pipeline ROW would be reseeded with BLM- and NRCS-approved seed mixes appropriate to soil and range conditions for the area. Agency consultation with MFWP is ongoing for these species and impacts to this species are not likely to adversely affect the species.

Townsend's Big-eared Bat. No historic communal bat roost sites (e.g., hibernacula, nursery colonies, bachelor roosts) have been recorded along the Project route, thus direct impacts to communal roosts are not anticipated. Impacts also would result from the short-term reduction of potential foraging habitat including habitat fragmentation until reclamation is completed and native vegetation has become reestablished. The BLM, Miles City Field Office, recommends surveys for the Townsend's big-eared bat if suitable habitat exists along the project (Appendix F). Impacts to this species are not likely to adversely affect the species.

Black-footed Ferret. According to surveys conducted in the spring and summer of 2008, black-tailed prairie dog colonies have been identified along the route. Burrow density requirements set forth in the 1989 Black-footed Ferret Survey Guidelines (USFWS 1989) have not been evaluated for these towns to date. If ferrets were present in prairie dog colonies along the Project route, direct impacts would include increased

habitat loss and fragmentation from the disturbance of prairie dog colonies or complexes along the Project route. Impacts also could result in direct mortalities of black-footed ferrets as a result of crushing from surface disturbance, vehicles, and heavy equipment. Indirect impacts to black-footed ferrets would include increased habitat fragmentation effects as a result of increased noise levels and human presence, dispersal of noxious and invasive weed species, and dust effects from unpaved road traffic. Indirect effects also could result in a reduction in habitat quality from the spread of infectious diseases (e.g., plague) within otherwise healthy prairie dog colony complexes.

In Nebraska and South Dakota, black-footed ferret surveys are no longer recommended in black-tailed prairie dog towns. It is assumed that areas not requiring surveys do not have the potential to support black-footed ferrets. Montana prairie dog towns have not been cleared and would require black-footed ferret surveys. Prairie dog towns identified along the route are listed in Table 4.2-7. Due to the low probability of occurrence in the vicinity of the Project route, it is anticipated that the Project would not likely adversely affect black footed ferrets.

Black-tailed Prairie Dog. As discussed in Appendix F, the black-tailed prairie dogs occur along the Project route. The potential effects of construction through a prairie dog colony include temporary loss of forage and shelter due to vegetation clearing, collapsing of burrows, and temporary disruption of foraging and resting activities due to disturbance associated with construction equipment. Direct mortality of prairie dogs could result if active burrows are occupied at the time of construction. If construction occurs later in the prairie dog reproductive season (late May to early June), most prairie dogs would be mobile and able to avoid construction traffic; however, some individual prairie dogs may be injured or lost during construction. In addition, there is a potential for destroying active dens with young if construction occurs during the reproductive season. Following construction and restoration, the revegetated ROW would provide foraging habitat for prairie dogs, and the unconsolidated soils along the trench would likely provide a good substrate for burrowing. The Project may impact individuals but would not likely to cause a trend to federal listing or loss of viability to black-tailed prairie dogs.

Table 4.2-7 Active Black-tailed Prairie Dog Colonies Recorded within the Construction ROW¹

MP	County	State
46.8	Valley	MT
115.9	McCone	MT
366.2	Perkins	SD
369.2	Perkins	SD
374.2-374.8	Meade	SD
380.6	Meade	SD
394.9	Meade	SD
398.8-399.1	Meade	SD
409.5-409.7	Meade	SD
411	Meade	SD
417.6	Meade	SD
520.8	Jones	SD
582.8	Tripp	SD

¹ Based on 2008 Biological Surveys

Swift Fox. Potential impacts to swift fox potentially occurring along the pipeline route include a temporary incremental loss of foraging and/or denning habitat. These animals would be disturbed by increased human presence and associated construction activities (noise, dust); however, since they are mobile species their displacement would be temporary and they would most likely return to the Project area when the Project is completed.

As a result of discussions with the MFWP, SDGFD, and BLM and as detailed in Appendix F, the Project traverses current swift fox distribution in Phillips, Valley, Dawson, and Prairie Counties in Montana (Kahn et. al. 1997) and in Haakon and Jones counties in South Dakota between the reintroduction sites of the Bad River Ranches (Turner Endangered Species Fund), Badlands National Park, and the Lower Brule Sioux Tribe Reservation (SDGFD 2008). Additionally, the Project crosses suitable habitat in Fallon and McCone counties in Montana and in Harding, Butte, Perkins, Meade, Pennington counties in South Dakota (Kahn et. al. 1997). Data from the Montana Natural Heritage Program indicates that the proposed route is not within 5 miles of any swift fox occurrence records. SDNHP data indicates three known occurrence records in Haakon County between MP 452.3 and 468.0.

If swift fox dens occur within the Project construction ROW, Project construction could result in a loss of individual animals if occupied. It is assumed that both adults and young would not avoid construction activities and would remain in natal den sites that could be directly removed by trenching activities or lost to vehicle operation. Construction activities prior to March would avoid direct effects to pups, if present. Loss of individual animals would result in an incremental reduction in the local population; however, no significant population effects are anticipated. If construction activity would occur in suitable habitat in the counties mentioned above during the breeding season (spring/summer), where dens are present, restrictions on construction activities would be required. According to Natural Heritage Data, the occurrence potential for this species along the Project route is low. With the completion of pre-construction surveys for natal den sites and because of the mobility of this species, swift fox would most likely be temporarily displaced and would return after construction. As a result the, potential impact to this species is not likely to adversely affect the species.

River Otter. Surveys for river otter dens will occur in the Spring of 2009. However, since most major rivers where suitable habitat exists will be crossed by the HDD construction method, impacts to this species are not likely to adversely affect this species.

Birds

Raptors and other Migratory Birds

Sensitive raptor species identified as potentially occurring along the route include the ferruginous hawk, Swainson's hawk, bald eagle, peregrine falcon, and the burrowing owl. As discussed in Section 3, aerial raptor nesting surveys were conducted in April 2008. No active Swainson hawk or peregrine falcon nests were observed during the survey. In addition, no documented historic breeding records for the peregrine falcon exist along the proposed route. Foraging habitat (i.e., wetland and open water) would be impacted by the pipeline in Montana and South Dakota, however this impact would be short-term and the construction ROW would be allowed to revegetate to previous conditions.

Aerial raptor surveys did not include the identification of burrowing owl nests. Burrowing owls typically use burrows made by prairie dogs and other small mammals. Destruction of burrows could result in displacement of owls into less suitable habitats, potentially increasing susceptibility to predation, reducing cover or forage habitat, or reducing reproductive success. Displacement, injury, or direct mortality could result if active burrows are occupied at the time of construction.

Surveys for active burrowing owl nests are recommended by MFWP, FWS, and BLM (BLM 2008) if construction is to occur during the nesting season (April 15 – October 1). Initial biological surveys (ENSR 2008) identified 13 prairie dog towns along the route (Table 4.2-7). Species-specific surveys for burrowing owl nests would occur prior to construction. Should an active burrowing owl nest be identified within the Project area, adherence to seasonal and spatial buffers for burrowing owls would be required as determined through agency consultation.

There are a number of migratory bird species listed as Species of Concern by Montana that may be impacted by the proposed Project. They include:

- Long-billed Curlew
- Loggerhead Shrike
- Chestnut-collared Longspur
- Red-headed Woodpecker
- Bobolink
- Lark Bunting
- Sprague's Pipit
- Dickcissel
- Franklin's Gull
- Yellow Rail
- White-faced Ibis
- American White Pelican
- Eastern Bluebird
- Sage Thrasher
- Black-crowned Night Heron
- Brewer's Sparrow
- Grasshopper Sparrow
- Harlequin Duck
- Marbled Godwit
- Black and White Warbler
- Common Tern
- Forster's Tern
- Caspian Tern
- Black Tern
- McCown's Longspur
- Baird's Sparrow
- Common Loon
- Wouldet
- Wilson's Phalarope

Potential impacts to these migratory species would be the same as discussed in Section 4.2.5.1 for non-game species. No further species specific surveys are proposed for these migratory bird species. Instead, if construction were to occur during the nesting period for migratory birds (April 15 – July 15), discussions with the FWS would be undertaken to determine what measures are required.

Mountain plover. Mountain plover surveys are recommended in Montana within prairie dog towns only. According to 2002 FWS mountain plover survey guidelines, surveys would be required between mid-April and early July prior to construction (USFWS 2002). However, since the only suitable habitat is associated with the larger rivers to be crossed using the HDD construction method, any impacts are not likely to adversely affect this species.

Piping Plover and Interior Least Tern. Initial piping plover and interior least tern nesting surveys were conducted in July 2008 at the Platte, Loup, Niobrara, and Cheyenne Rivers. One foraging piping plover was identified at the Niobrara River. The results of the 2008 surveys can be found in Appendix F – Survey Report. In addition to the rivers listed above, the Yellowstone River also contains suitable habitat but access to the crossing was impossible at the time of surveys due to high water levels. All of these rivers will be crossed using the HDD construction method, therefore, impacts are not likely to adversely impact these species.

Greater Sage Grouse. The Greater Sage Grouse is designated as a sensitive species by the state of Montana and by the BLM and has been petitioned for federal listing consideration. In April 2004, the USFWS determined that listing the sage-grouse under the ESA may be warranted and initiated a status review. However, based on a 12-month finding for petitions to list the greater sage-grouse as threatened or endangered, the USFWS has subsequently determined that the listing is not warranted (70 FR 2244). Recently, the USFWS has reopened a 90-day status review to determine whether or not listing under the ESA is warranted.

Locations of historic lek sites were identified by the MNHP and BLM, and specific timing restrictions and buffer zones are listed in Appendix F. In addition, the MFWP has recommended aerial lek surveys during the breeding season prior to construction in order to identify active sage grouse leks and to subsequently develop recommended mitigation measures that would allow pipeline construction to proceed.

Reptiles/Amphibians

Potential impacts to amphibian and reptile species include direct mortalities of individuals from construction activities, ground compaction, and vehicle traffic within suitable habitat. Impacts also would result from the incremental long-term reduction of potential habitat until reclamation is complete and vegetation reestablished.

As a result of agency consultation, additional surveys for the Massasauga are required in Jefferson County, Nebraska.

All other reptile and amphibian species (Western hog-nosed snake, milksnake, snapping turtle, spiny softshell, common sagebrush lizard, Greater short-horned lizard, Great Plains toad, Plains spadefoot, Northern leopard

frog) species included on the BLM Sensitive Species List for Montana would be the subject of pedestrian surveys in a 300-foot corridor centered on the construction ROW. These surveys would be completed in the spring of 2009.

Invertebrates

American Burying Beetle. To avoid impacts to the American burying beetle, the Project conducted a habitat assessment in August 2008. Suitable habitat was located along the proposed route between Tripp County, South Dakota and Wheeler County, Nebraska. Only small pockets of suitable habitat were identified along the proposed route south of Wheeler County, Nebraska. In 2009, the Project plans to conduct presence/absence surveys in areas of suitable habitat in Nebraska only. The USFWS in South Dakota does not recommend further trapping procedures (Appendix F). Once presence/absence of the American burying beetle along the proposed route in Nebraska has been determined, the Project would conduct trap and relocate procedures in areas of suitable habitat in August prior to construction. Project impacts are not likely to adversely affect the species.

Aquatic Species

The Project would cross 16 streams or rivers that contain known or potential habitat for special status fish species. These include Frenchmen Creek, Milk River, Missouri River, Yellowstone River, Redwater River, Boxelder Creek, Cherry Creek, White River, Cheyenne River, Cottonwood Creek, Keya Paha River, Niobrara River, Holt Creek, South Fork Elkhorn River, Loup River, and Platte River. However, impacts to special status species at the Milk, Missouri, Yellowstone, White, Cheyenne, Keya Paha, Niobrara, Loup, and Platte Rivers would be avoided using HDD crossing methods. Other streams will be surveyed to determine species presence, or presence will be assumed and construction timing or methods will be developed to minimize impacts to these species.

Gulf Coast Segment

As discussed in Section 3.7.3, Sensitive Terrestrial and Aquatic Wildlife Species, a total of 38 terrestrial wildlife species (31 special status species and 7 species of special concern) could potentially occur within the Project area. Twelve of these species are federally listed as threatened or endangered (Louisiana black bear, black bear, brown pelican, Eskimo curlew, interior least tern, piping plover, red-cockaded woodpecker, whooping crane, Houston toad, American burying beetle, Texas prairie dawn-flower, and Texas trailing phlox). Three of these species are federally delisted and under a five year monitoring period (American peregrine falcon, Arctic peregrine falcon, and bald eagle) and four of these species are federal candidates (Salado salamander, Louisiana pine snake, Neches River rose-mallow, and Texas golden glade-creep). Additionally, one bird group of special concern (rookeries) could potentially occur within the Project area. See Table 3.8-5 for aerial survey results.

Preconstruction surveys would occur for a subset of these species as determined based on habitat surveys conducted this year and consultations with the USFWS and state wildlife agencies (See Section 3.7.3). Species that were not likely to occur within the Project footprint, based on agency knowledge of habitat and current distribution, or which the USFWS preferred other forms of mitigation, were eliminated from species-specific surveys (see Appendix F).

Table 4.2-8 Results of March 2008 Aerial Surveys for the Gulf Coast Segment and Houston Lateral

Species	MP	Distance (feet), direction from Centerline
Gulf Coast Segment - Oklahoma		
Raptor (<i>Buteo</i> sp.) sighting	22.8	1,055, E

Table 4.2-8 Results of March 2008 Aerial Surveys for the Gulf Coast Segment and Houston Lateral

Species	MP	Distance (feet), direction from Centerline
Unidentified nest	28.4	255, W
Unidentified nest	28.8	125, W
Raptor (<i>Buteo</i> sp.) sighting and nest	29.3	75, E
Unidentified nest	36.8	3,290, E
Unidentified nest	44.4	17, W
Unidentified nest	75	1,175, W
Unidentified nest	75	4,335, W
Unidentified nest	104.8	87, W
Unidentified nest	141.8	50, W
Gulf Coast Segment - Texas		
Unidentified nest	155.2	1,050, E
Unidentified nest	155.4	2,635, E
Unidentified nest	155.8	4,875, E
Unidentified nest	159.6	5,200, SW
Unidentified nest	164.7	223, W
Unidentified nest	203.1	75, W
Raptor (<i>Buteo</i> sp.) sighting and nest	206.1	20, W
Raptor (<i>Buteo</i> sp.) sighting and nest	213.6	325, W
Bald eagle sightings	262 - 361	Various locations
Unidentified nest	277.9	400, W
Great blue heron rookery	300.3	890, W
Great blue heron rookery	309.3	3,385, E
Great blue heron rookery	368.3	855, E
Houston Lateral - Texas		
Great blue heron and roseate spoonbill rookery	9.8	587, E
Unidentified nest	18.3	1,390, NW

Black bear/Louisiana black bear. The Louisiana black bear sub-species is federally threatened in Texas and the black bear is given the same protection within the Louisiana black bear's historic range in eastern Texas due to its similarity in appearance. Habitat of the Louisiana black bear typically includes large tracts of bottomland hardwoods that are not altered by human use, along with vegetated corridors for dispersal and large trees for den sites. Currently, there is not a resident breeding population of the Louisiana black bear in Texas, although dispersing juvenile males have been sited in Texas (Campbell 2003, NatureServe 2008).

Species-specific surveys are not planned for the Louisiana black bear. This species is not expected to be impacted by the Project as it is infrequently found and there are no known den sites in the Project area in Texas (Campbell 2003) and due to the mobility of individuals that may migrate through the Project area.

American peregrine falcon/Arctic peregrine falcon. The American and Arctic peregrine falcons are federally delisted in Texas and may be present in the Project area in Texas as a migratory species. Habitat includes stopovers at landscape edges, such as lake shores, coastlines, or farmlands (Campbell 2003, NatureServe 2008).

Species-specific surveys are not planned for the American or Arctic peregrine falcon. These species are not expected to be impacted by the Project as they do not breed or nest within the Project area in Texas. Individuals that may migrate through the Project area during construction are mobile and able to move to undisturbed areas.

Attwater's greater prairie-chicken. The Attwater's greater prairie-chicken is federally endangered in Texas and potential habitat occurs along the coastal plain of Texas in coastal prairie grasslands with little woody cover and a mixture of native tall grasses (Campbell 2003).

Species-specific surveys are not planned for the Attwater's greater prairie-chicken. As of 2003, there were only two known populations of this species in Texas and these populations occur outside of the Project area. Therefore, this species is not expected to be impacted by the Project.

Bald eagle. Nesting habitat of the bald eagle usually occurs along river systems, reservoirs, or lake shores with large, tall trees. This species may occur within the Project area in Oklahoma and Texas as a spring and fall migrant, breeders, or winter residents (Campbell 2003).

Aerial surveys for bald eagle nests and winter roosts would occur within 1 mile of the construction ROW. Initial surveys occurred in March 2008 and additional surveys are planned for February/March 2009, as well as prior to construction in 2010 and 2011.

Brown pelican. The brown pelican is federally endangered in Texas and nests on small, coastal islands in Texas. Part of the Texas population spends nonbreeding season along Texas coast (Campbell 2003).

Species-specific surveys are not planned for the brown pelican. This species is not expected to be impacted by the Project as it does not nest within the Project area and due to the mobility of individuals that may occur within the Project area during construction.

Eskimo curlew. The Eskimo curlew is federally endangered in Texas. Historically, this species could be found in the Project area as a migratory species during the spring. This species is thought to be close to extinction and the last recorded sighting in Texas was in 1987 (Campbell 2003).

Species-specific surveys are not planned for the Eskimo curlew. This species is not expected to be impacted by the Project as it has not recently been recorded in the Project area and was not historically known to nest in the Project area.

Interior least tern. The interior least tern is federally endangered in Oklahoma and Texas. This species nest along inland river systems and reservoirs, especially in areas with little human disturbance and bare beaches. In the Project area in Oklahoma and Texas, it is known to nest along the Red River, Canadian River, and North Canadian River (Campbell 2003, NatureServe 2008).

Species-specific surveys are not planned for the interior least tern because the three rivers that contain suitable habitat for this species would be crossed using the HDD construction method. Therefore, the Project is not likely to adversely impact this species.

Piping plover. The piping plover is federally endangered in Oklahoma and Texas. This species is a migratory North American shorebird that winters along the Texas Gulf Coast in bare or very sparsely vegetated tidal mudflats, sand flats, algal flats, or beaches. Plovers may be present throughout the remainder of Texas and Oklahoma when migrating to and from northern breeding grounds (Campbell 2003, NatureServe 2008).

Species-specific surveys are not planned for the piping plover. This species is not expected to be impacted by the Project as it does not nest within the Project area and due to the mobility of individuals that may occur within the Project area during construction. If this species happens to land in close proximity to the construction ROW during construction, its presence would be documented and protective measures would be developed.

Red-cockaded woodpecker. The red-cockaded woodpecker (RCW) is listed as federally endangered in the state of Texas. This species is found in mature pine forests of east Texas. RCWs nest and roost in clusters of trees containing excavated cavity trees with a grassy or herbaceous understory with little mid-story (Campbell 2003).

The USFWS is not requiring surveys for this species, as no known RCWs or potential habitat are located within the survey corridor for the Project (see correspondence in Appendix F).

Whooping crane. The whooping crane is a federally listed endangered species that winters in marshes and salt flats of the Aransas National Wildlife Refuge and adjacent wetlands in southeast Texas. It has the possibility of occurring throughout the remainder of Texas and Oklahoma as a migratory species from Canadian nesting grounds (Campbell 2003).

Species-specific surveys are not planned for the whooping crane as this species does not nest within the Project area. If this species happens to land in close proximity to the construction ROW during construction, its presence would be documented and protective measures would be developed with the FWS.

Fish

Arkansas river shiner. The Arkansas river shiner is listed as federally endangered in Oklahoma. It typically occurs in turbid waters of broad, shallow, unshaded channels of creeks and small to large rivers in the Arkansas River basin, over mostly silt and shifting sand bottoms (NatureServe 2008).

Species-specific surveys are not planned for the Arkansas river shiner because the Canadian River and North Canadian River would be crossed using the HDD construction method. Therefore, the Project is not likely to adversely impact this species.

Smalleye shiner. The smalleye shiner is federally characterized as a candidate species with a known distribution in Texas including the Brazos River and its tributaries. This species is most often found in shallow water in broad, open sandy channels with a moderate current (NatureServe 2008).

Species-specific surveys are not planned for the smalleye shiner as the known distribution in Texas is outside of the Project survey corridor.

Amphibians

Houston toad. The Houston Toad is a federally endangered terrestrial amphibian associated with soft sandy soils within pine or mixed deciduous forests and coastal prairie areas of East Texas. It is often found in shallow ephemeral pools, flooded fields, or wet areas associated with springs or seeps when inactive (Campbell 2003, NatureServe 2008).

Species-specific surveys are not planned for the Houston Toad as the known distribution in Texas is outside of the Project survey corridor.

Salado salamander. Federally characterized as a candidate species, this completely aquatic salamander is restricted to the immediate vicinity of spring outflows, where it may be found under rocks and in gravel substrate.

Species-specific surveys are not planned for the Salado salamander as the known distribution in Texas is outside of the Project survey corridor.

Reptiles

Louisiana pine snake. Federally characterized as a candidate species, these snakes occur in longleaf pine-oak sandhills interspersed with moist bottomlands; sometimes in adjacent blackjack oak woodlands and in sandy areas of short-leaf pine/post oak forest. The snake prefers openly wooded areas over dense forest, and it is frequently found in fields, farmland, and tracts of second-growth timber (NatureServe 2008).

During pedestrian surveys, no documented species of the Louisiana pine snake was observed. Therefore, the Project is not likely to adversely impact these species.

Invertebrates

American burying beetle (ABB). This federally listed endangered species prefers areas that are undisturbed by human activity, and is known to inhabit grassland prairies, scrubland, and forest edges (NatureServe 2008).

As a result of agency consultations, the USFWS recommended a contribution to the ABB Conservation Fund equal to the costs of surveys and relocation in lieu of conducting surveys and relocation efforts.

Ouachita rock pocketbook. This federally listed endangered species is known to exist in the Red River system where it may be found in backwater areas of rivers with sluggish current and stable substrates containing gravel or sand. It generally occurs within large mussel beds containing a diversity of species (NatureServe 2008).

Species-specific surveys are not planned for the Ouchita rock pocketbook because the Red River would be crossed using the HDD construction method. Therefore, the Project is not likely to adversely impact this species.

Plants

Neches river rose-mallow. The distribution for this federal candidate species includes Angelina, Cherokee, and Trinity counties in east Texas. The plants are typically found in openings in shrub swamps or along margins of riparian woodlands in seasonally wet soils (NatureServe 2008).

Texas golden gladeceess. This federal candidate species occurs in Coastal Plain region of eastern Texas in herbaceous communities in vernal wet glades with shallow, calcareous soils on Weches Formation ironstone outcrops (NatureServe 2008).

Texas prairie dawn-flower. This federally listed endangered species occurs in poorly drained, sparsely vegetated areas at the bases of mounds within pimple mound wetlands where soils are slightly saline (NatureServe 2008).

Texas trailing phlox. This federally listed endangered species occurs in sandy soils of fire-maintained openings in pine savannahs or oak woodlands (NatureServe 2008).

During pedestrian surveys, no documented species of the Neches river rose-mallow, Texas golden gladeceess, Texas prairie dawn-flower, or Texas trailing phlox were observed. Therefore, the Project is not likely to adversely impact these species.

Aquatic Species

The Project route would cross 205 streams or rivers that contain known or potential habitat for special status fish species. These include the Milk River, Missouri River, Yellowstone River, Cheyenne River, White River, Keya Paha River, Niobrara River, Loup River, Platte River, North Canadian, Canadian, Little River, Deep Fork, Red River, North & South Sulphur, Sabine River, Angelia River, Neches River, Trinity River, San Jacinto River. Of these rivers, all would be crossed with the HDD construction method. Therefore, the Project is not likely to adversely impact the species.

Impacts that could affect sensitive fish and mussel species are similar to those discussed for game fish species. Construction-related impacts on sensitive species living in streams crossed by the Project using HDD (Table 2.1-6) would be minor, since directional drilling would eliminate disturbance within the channel. In contrast, open-cut trenching at other streams listed above would result in alteration of bottom substrates, temporary increased sedimentation, and possible removal of riparian vegetation. The degree of impact would depend upon whether important fish spawning or rearing habitat is altered. Adult fish are likely to move away from the construction area. Generally, impacts could range from several weeks to several years, depending on the life stages affected and whether future spawning is affected.

Potential water sources for hydrostatic testing and dust control include the following streams that contain sensitive fish and mussel species: North Canadian and Canadian Rivers. Specific water volumes to be withdrawn from these streams are not known at this time but would be quantified as details of the hydrostatic test plan are finalized. Nevertheless, water use from any of these streams would result in a relatively small, one-time flow reduction. Water withdrawal is expected to represent a relatively small percentage of base flow. Therefore, impacts on fish or mussel habitat would be considered minor in the mid-size to large streams. The discharge of hydrostatic test water would follow state permit requirements, eliminating potential water quality effects on sensitive species. As part of the consultation with the USFWS for threatened and endangered species in the Platte River, water use (in acre-feet) must be identified. The depletion is determined by dividing the consumptive use by the duration of the Project in years. Depletions are considered minor if the volume is less than 25 acre-feet.

Operation

To reduce potential impacts to sensitive wildlife species as a result of maintenance activities, Keystone would consult with the appropriate state wildlife or land management agency prior to the initiation of maintenance activities beyond standard inspection measures.

Keystone will employ multiple safeguards to prevent a pipeline release. The chance of a spill occurring is very low and if a spill occurred, the volume is likely to be relatively small. In the unlikely event of a pipeline release, Keystone would initiate its Emergency Response Plan and emergency response teams would contain and cleanup the spill. To minimize impacts to special status species, appropriate remedial measures will be implemented to meet federal and state standards designed to ensure protection of human health and environmental quality.

4.2.6 Land Use and Aesthetics

Issues

The following land use issues are likely to be encountered by the Project:

- establishment of a new pipeline ROW;
- potential damage to agricultural equipment or features (e.g., drainage tiles and irrigation systems) during construction;
- temporary loss of agricultural productivity during the construction period;

- potential visual impacts associated with the construction ROW which include removal of existing vegetation, exposure of bare soils, and earthwork and grading scars;
- increased noise and dust to nearby residential and commercial areas from pipeline construction activities; and
- increased noise to nearby residential and commercial areas as a result of pump station operations

Construction

Private lands make up 94 percent of the lands affected by construction of the Project. Table 4.2-9 summarizes the acreage of federal, state, and private land that would be temporarily disturbed by construction of the Project.

Table 4.2-9 Construction Acreage on Federal, State, and Private lands

	Federal	State	Private	Total
Montana	591.1	271.8	3,390.7	4,253.2
South Dakota	0.0	289.1	4,412.1	4701.2
Nebraska	0.0	0.0	3,889.2	3,889.2
Kansas	0.0	0.0	10.0	10.0
Oklahoma	0.0	0.2	2,293.4	2,293.6
Texas	0.0	0.2	4981.5	4,981.7
Texas Lateral	0.0	0.0	653.9	653.9
Project Total⁹	591.1	560.9	19,630.8	20,782.8

Note: Acreage does not include 1,484.7 acres of disturbance associated with pipe storage/contractor yards or disturbance associated with power lines. Pipe storage/contractor yards are anticipated to be located on private lands.

The principal land uses affected by the Project would be rangeland and agriculture. The Project crosses land composed of 52.1 percent and 24.6 percent grassland/rangeland and agriculture, respectively. Other land use categories that would be affected by construction of the Project include forest, water, wetland/riparian, and developed land.

Surface disturbance to various land uses caused by construction of the Project are summarized in Table 4.2-10. A relatively small, temporary loss of crops and forage land would occur in many agricultural and rangelands during construction. In areas where drain tiles are present, the tiles may be damaged by the installation of the pipeline. Keystone would repair or restore drain tiles, fences, and land productivity that are temporarily disturbed during pipeline construction, as described in the CMRP. The CMRP also describes topsoil handling and reclamation practices designed to restore land productivity to its prior use.

Table 4.2-10 Land Uses Affected by Construction of the Project (Acres)

	Developed	Agriculture/ Cropland	Rangeland	Forest	Water	Wetland/ Riparian	Total
Montana	48.1	1,017.0	3,108	11.2	50.2	18.7	4,253.2
South Dakota	43.3	1,115.7	3,449.2	12.4	58.5	21.6	4701.2
Nebraska	64.1	1,777.9	1,888.8	53.0	23.9	81.5	3,889.2
Kansas	0.0	10.0	0.0	0.0	0.0	0.0	10.0
Oklahoma	304.3	150.0	1,194.4	615.1	21.2	8.6	2,293.6
Texas	557.5	662.7	1,845.1	1,711.2	20.8	184.4	4,981.7
Texas Lateral	78.6	43.5	0.0	281.2	9.7	241.0	653.9
Project Total	1,095.9	4,776.7	11,485.5	2,684.1	184.3	556.2	20,782.8

Note: Acreage does not include 1,487.7 acres of disturbance associated with pipe storage/contractor yards or disturbance associated with power lines.

Discrepancies in totals are due to rounding.

Residences within 500 feet of the Project ROW (see Section 3.8) would experience short-term inconvenience from construction equipment noise and dust for a period of 7 to 30 days. During construction, Keystone would be required to comply with any local construction noise requirements. Noise and dust impacts from construction activities would be mitigated according to the CMRP.

Structures located within 25 feet of the construction ROW are summarized in Table 2.1-7. The majority of the structures located within 25 feet of the construction ROW are found on the Gulf Coast Segment of the Project. Keystone will conduct surveys of these structures during the spring of 2009 to determine if they are inhabited or abandoned and provide site-specific crossing plans and procedures for crossing in close proximity to residences.

There is one USFWS wetland easement crossed by the Project in Montana. One easement for Montana Fish, Wildlife and Parks is currently under negotiation, and will be located in Montana. Conservation Reserve Program (CRP) lands are crossed in Montana, South Dakota, and Nebraska (Table 3.8-7). The Project would cross multiple parcels under the jurisdiction of Montana State Lands and South Dakota Game, Fish, and Parks (Table 3.8-6). Mitigation measures outlined in the CMRP would minimize impacts to these areas. No special interest areas such as USFWS wetland easements, NRCS conservation easements, or federal or state owned parks crossed by the Project in Oklahoma. However there is a NRCS Wetland Reserve Program (WRP) easement in Texas. This area would be crossed using the HDD construction method.

The Project does not cross any rivers within segments declared as wild or scenic. Construction of the Project would have temporary impacts on recreational traffic and use patterns during construction activities in special management areas and recreational areas. Sightseers, hikers, wildlife viewers, hunters, etc., would be displaced from the immediate area during construction. Keystone would continue to coordinate with agency managers to minimize conflicts between construction activities and recreational uses for which these special areas were established. These impacts would be of short duration with no long-term impacts.

Visual impacts associated with construction of the Project include removal of existing vegetation, exposure of bare soils, earthwork and grading scars, and landform changes that introduce contrasts. Keystone aligned the pipeline route to avoid aesthetic features to the extent possible. Visual impacts from construction activities would be of short duration with no significant long-term impacts due to implementation of Keystone's mitigation measures outlined in the CMRP.

Operation

Certain existing land uses would be converted to long-term utility use for the duration of the pipeline's operation. This conversion represents a long-term future constraint on development of private land because dwellings cannot be placed on the permanent pipeline ROW for the entirety of the ROW lease period. The 50-foot operational ROW would be maintained in an open condition for the life of the pipeline facilities. No other operational impacts are anticipated to agriculture and rangeland or special management areas. If there are to be surface disturbances due to future maintenance activities, these would be reclaimed after the disturbance, utilizing measures described in the CMRP. Recreational use access would not be affected by pipeline operations within special management areas.

The visual impact of aboveground facilities would depend on the location of each facility and its visibility from the surrounding area. Keystone located the pump stations based on hydraulic and engineering design considerations, but also considered impacts on aesthetics and sensitive environmental resources in determining the facility locations. Pump stations are located on private range or agricultural lands.

During operation of the pipeline, the noise impact associated with the electrically-driven pump stations would be limited to the vicinity of the facilities. Keystone will identify noise sensitive receptors within one mile of proposed pump station locations.

Noise impacts from the electrically-powered pump stations are anticipated to be minor. Noise mitigation measures would be applied if needed to meet federal, state and local regulations. The pump stations would be constructed in a manner to minimize potential impacts from noise.

4.2.7 Cultural Resources

Issue

- construction and operation of the Project could affect National Register of Historic Places (NRHP)-eligible historic properties such as prehistoric or historic archaeological sites, districts, buildings, structures, and objects.

Construction

Those areas in which construction activity is planned or where impacts are likely to occur are referred to as the “area of potential effect” or APE. Specifically, the APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of NRHP-eligible sites.

Only those cultural resources located in the APE were reviewed to determine if any would be subject to impacts that could affect their eligibility for the NRHP based on NRHP criteria for evaluation. For the Project, the APE is the 200-foot survey corridor in areas where the Project parallels an existing pipeline, the 300-foot survey corridor in greenfield areas, the footprint of proposed pump stations, access roads to be used or upgraded during construction, pipe yards, contractor yards, and any other temporary use or staging areas, plus a 50-foot buffer.

Cultural resource field surveys along selected segments of the pipeline corridor have been ongoing since June 2008. As a result of the field surveys, Keystone is recommending 50 potentially eligible and 16 eligible for listing on the NRHP, and 89 sites as ineligible for listing. These sites were determined to be located within or adjacent to the Project APE. Avoidance or evaluation to definitively determine NRHP eligibility was recommended for these sites. Re-routes, boring, or construction ROW with reduction is currently being evaluated for all of the eligible and potentially eligible sites. The remainder would not require additional work.

Construction and operation of the Project could potentially affect NRHP-eligible sites. These could include prehistoric or historic archaeological sites, districts, buildings, structures, objects, and locations with traditional cultural value to Native Americans or other groups. Project impacts could include: the physical disturbance during construction of archaeological sites located within the Project APE; the demolition, removal, or alteration of historic or architecturally significant structures or features; and the introduction of visual or audible elements (e.g., pump stations) that could alter the site’s setting. Impacts to NRHP-eligible sites would be mitigated through avoidance or SHPO- and lead federal agency-approved data recovery techniques. Mitigation may include one or more of the following measures: (1) avoidance through the use of realignment of the pipeline centerline, relocation of pump stations, or changes in the construction or operational design; (2) data recovery, which may include the systematic professional excavation of an archaeological site or the preparation of photographic or measured drawings documenting standing structures; and (3) the use of landscaping or other techniques that would minimize or eliminate effects on the historic setting or ambience of standing structures.

Whenever feasible, Keystone would avoid NRHP-eligible sites identified within the Project APE. Keystone would consult with the appropriate SHPOs to identify measures to avoid adversely affecting these sites. If adverse effects to any NRHP-eligible sites cannot be avoided, Keystone would develop treatment plans for mitigating those effects. Keystone would file avoidance or treatment plans, as appropriate, with the appropriate SHPOs and the lead federal agency.

Construction activities and associated operations could adversely affect undiscovered archaeological sites. If previously undocumented sites are discovered within the construction corridor during construction activities, all work that might adversely affect the discovery would cease until Keystone, in consultation with the appropriate

parties, can evaluate the site's eligibility and the probable effects. If the previously unidentified site is recommended as NRHP eligible, impacts would be mitigated through the steps outlined in an approved Unanticipated Discovery Plans are included with each field survey report found in Appendix G.

If construction or other Project personnel discover what they believe to be human remains, funerary objects, or items of cultural patrimony on federal land, construction would cease within the vicinity of the discovery and the appropriate agency and tribal representatives would be notified of the find in accordance with NAGPRA. Construction would not resume in the area of the discovery until the authorized agency issues a notice to proceed.

If human remains and associated funerary objects are discovered on state or private land during construction activities, construction would cease within the vicinity of the discovery and the county coroner or sheriff would be notified of the find. Treatment of any discovered human remains and associated funerary objects found on state or private land would be handled in accordance with applicable state laws.

Operation

The primary impact of the operation phase of the Project is the potential introduction of visual or audible elements (e.g., pump stations), which could alter the setting associated with historic properties. Keystone would mitigate these operational impacts to NRHP-eligible sites by the use of landscaping or other techniques that would minimize or eliminate effects on the historic setting or ambience of standing structures.

4.2.8 Socioeconomics

Issues

The following socioeconomic issues are likely to be encountered by the Project:

- compensation to landowners for conveyance of easements and restrictions and damage to land and property;
- construction workforce demands on local infrastructure;
- fiscal benefits from goods and services purchased locally and associated tax revenue; and
- ongoing tax revenues generated by the Project.

Construction

Compensation for Damages to Land Use and Property

The Project would be constructed in predominantly rural, agricultural areas. Keystone would acquire pipeline ROW easements from landowners and would provide landowners with monetary compensation for the conveyance of those easements. Construction activities would create the potential for damage to land and property, including drainage tiles, irrigation systems, fences, and crop productivity. Keystone would restore damaged or disturbed lands, repair or restore damaged property, or compensate owners for damages as agreed to in advance in the easement agreements or negotiated on a case-by-case basis. In addition, the easement area is returned to its preconstruction use with the exception of timber and aboveground facility sites.

Demands on Local Infrastructure

Construction of the Project is proposed to be completed in 13 spreads (see Table 2.1-9). Keystone anticipates that it would require 6 to 9 months to complete each spread. Work on the Project is proposed to commence in 2010 and to be complete in of 2012. The spreads of the Gulf Coast Segment and Houston Lateral would be constructed 2010 and 2011. The spreads of the Steele City Segment would be constructed in 2011 and 2012. Approximately 500 to 600 construction personnel (Keystone employees, contractor employees, construction

inspection staff, and environmental inspection staff) are expected to be associated with each spread for a total workforce of 3,500 to 4,200 construction personnel. Additionally, construction of pump stations and delivery facilities would require additional 20 to 30 workers per station. Construction of pump stations and delivery stations is to commence in 2010 and be completed by 2012.

Keystone would attempt to hire temporary construction staff from the local population where possible. Keystone estimates that long-term operation of the pipeline would require 20 permanent employees in the US.

The Project construction period would be relatively short in any given area and most non-local workers would not be accompanied by their families during their work tenure. Consequently, it is expected that most Project workers would use temporary housing, such as hotels, motels, recreational vehicle parks, and campgrounds. Some workers are likely to rent furnished apartments and homes, due to the constrained availability of other accommodations, though this is generally less preferable because landlords and property management companies prefer extended term commitments. Most of the temporary workers would seek housing in the more populated, service-oriented towns located within a reasonable commuting distance to the work site. As the more convenient options fill, workers would seek alternatives, driving farther, looking at smaller communities, even using campgrounds in nearby state parks, which typically have limits on the length of occupancy. Furthermore, some individuals may desire to relocate during the term of the Project as the active construction area in each spread moves along the pipeline route. The net effect of these factors is that the temporary housing demand would be dynamic.

In the more rural portions of the Project, it would be more difficult for local housing markets to fill these temporary housing needs due to the limited availability of temporary housing in close proximity to construction work sites. Construction workers in these areas are likely to drive farther to find housing in nearby small towns or rely more heavily on recreational vehicle parks and campgrounds. Conversely, in the portions of the route through more populated areas, the local housing markets would be much more likely to absorb the temporary housing needs of construction workers as they would be more likely to find hotels and motels in towns and cities close to construction work sites.

Other construction-related impacts on local services may include increased demand for permits for vehicle load and width limits and local police assistance during construction at road crossings to facilitate traffic flow. In more rural sections of the proposed route, response times to highway or construction-related accidents may be lengthy, given communication, dispatch, and travel time considerations. In these areas, it may be necessary to provide on-site first responder services; however, Keystone would work with local law enforcement, fire departments, and emergency medical services to determine the best course of action and coordinate for effective emergency response. Plans associated with these issues are addressed in the ERP. The degree of impact would vary from community to community, depending on the number of non-local workers and accompanying family members that temporarily reside in each community, the duration of their stay, and the size of the community. Although these factors are too indeterminate and variable to accurately predict the magnitude of impact, the effects would be short-term and, therefore, not expected to be significant.

Short-term Fiscal Benefits

In addition to property taxes, state, county, and local taxing jurisdictions would receive taxes on gross receipts from the sales of goods and services. These taxes and fees vary by region and locality and would be received only during the construction period.

Operation

Demands on Local Infrastructure

The limited number of permanent employees associated with the Project would result in negligible long-term impacts on public services.

Long-Term Fiscal Benefits

In the operation phase, the pipeline would increase the tax base in the states, counties, and communities crossed. Keystone has estimated that a total of approximately 140 million would be paid in property taxes during the first year of pipeline operation for the Project. Based on 2006 property assessment and tax rate information for each state/county, the distribution by state for the first year of property taxes would be 61 to Montana, 15 million to South Dakota, 22 million to Nebraska, 4 million to Kansas, 14 million to Oklahoma, and 25 million to Texas.

Environmental Justice

The demographic analysis contained in section 3.11.4, Environmental Justice, revealed minority and low income populations residing at various locations along the Project route. Public participation is a goal of the NEPA process; this participation is especially important when low-income populations, minority populations or tribal populations have the potential to be affected by a Project. Therefore, Keystone has been engaged in public consultation since the Project was first announced in July 2008. Keystone is committed to ongoing and regular correspondence, communication, and consultation with all stakeholders. Twenty-six open houses have been undertaken to date. Keystone shares information about the Project and provides opportunities for identification and resolution of questions, issues, and concerns through a number of channels, including press releases, the Project web site, e-mail, toll free telephone numbers, one-on-one discussions between landowners and land agents, and direct mailings. To date, Keystone's public participation program included meetings with community leaders and open houses. Public participation and consultation activities would continue throughout the life of the Project.

The Project does not traverse any Native American lands; Section 3.10 describes the interactions Keystone has had with Native American populations in the Project area.

As explained in greater detail in Chapter 2, the purpose of the Project is to transport incremental crude oil production from the WCSB to meet growing demand by refineries and markets in the US. The Project responds to several needs, including the increasing crude oil demand in the US and decreasing domestic crude supply and the opportunity to reduce US dependence on foreign offshore oil through increased access to stable, secure Canadian crude oil supplies. These Project benefits would be realized for the population as a whole, regardless of race and income.

Both short-term and long-term benefits would stem from increases in employment opportunities for the areas surrounding the Project route. Increased spending in the affected areas also would benefit community businesses that would provide materials and services for the construction and operation of the pipeline / pumping stations. In addition, increases in state and local property tax revenues would provide additional monies to local governments, some of which may be used to support local social programs for minority and/or low income groups.

The pipeline route was selected based on criteria outlined in Section 2.4, which are unrelated to the demographics of the surrounding area. While portions of the new pipeline and new and upgraded pumping stations are located in areas of significant minority populations and with families living below the poverty level, the Project is also located in areas of majority white populations and with relatively few families living below the poverty level. Project impacts would be the same regardless of the demographics of the surrounding population. The evaluations contained throughout this document consider the potential Project impacts on environmental indicators including but not limited to air quality, water quality, noise, land use, socioeconomics, ecology and natural resources. The environmental impacts have been considered for all communities, including those with high minority populations and low income populations. The analyses demonstrate that the Project would result in neither adverse nor disproportionate impacts to minority or low income populations.

4.2.9 Public Health and Safety

Issues

- Risk of crude oil releases (leaks and spills) during pipeline operations, including the contribution of natural hazards (seismicity and faults, landslides, and subsidence) to this risk and the subsequent potential effects on humans and other sensitive resources such as populated areas, drinking water sources, and ecologically sensitive areas.

Keystone will employ multiple safeguards to prevent a pipeline release. The chance of a spill occurring is very low and if a spill occurred, the volume is likely to be relatively small. In the unlikely event of a pipeline release, Keystone would initiate its Emergency Response Plan and emergency response teams would contain and cleanup the spill. To minimize impacts to the public, appropriate remedial measures will be implemented to meet federal and state standards designed to ensure protection of human health and environmental quality.